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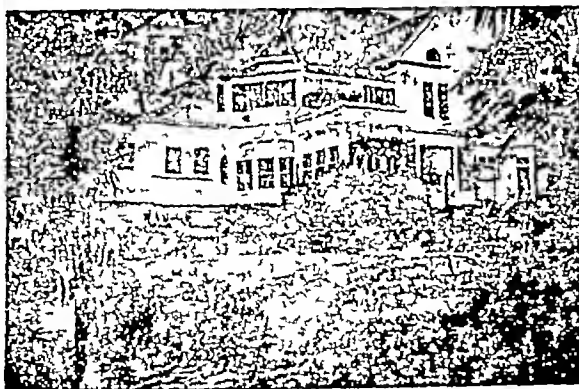
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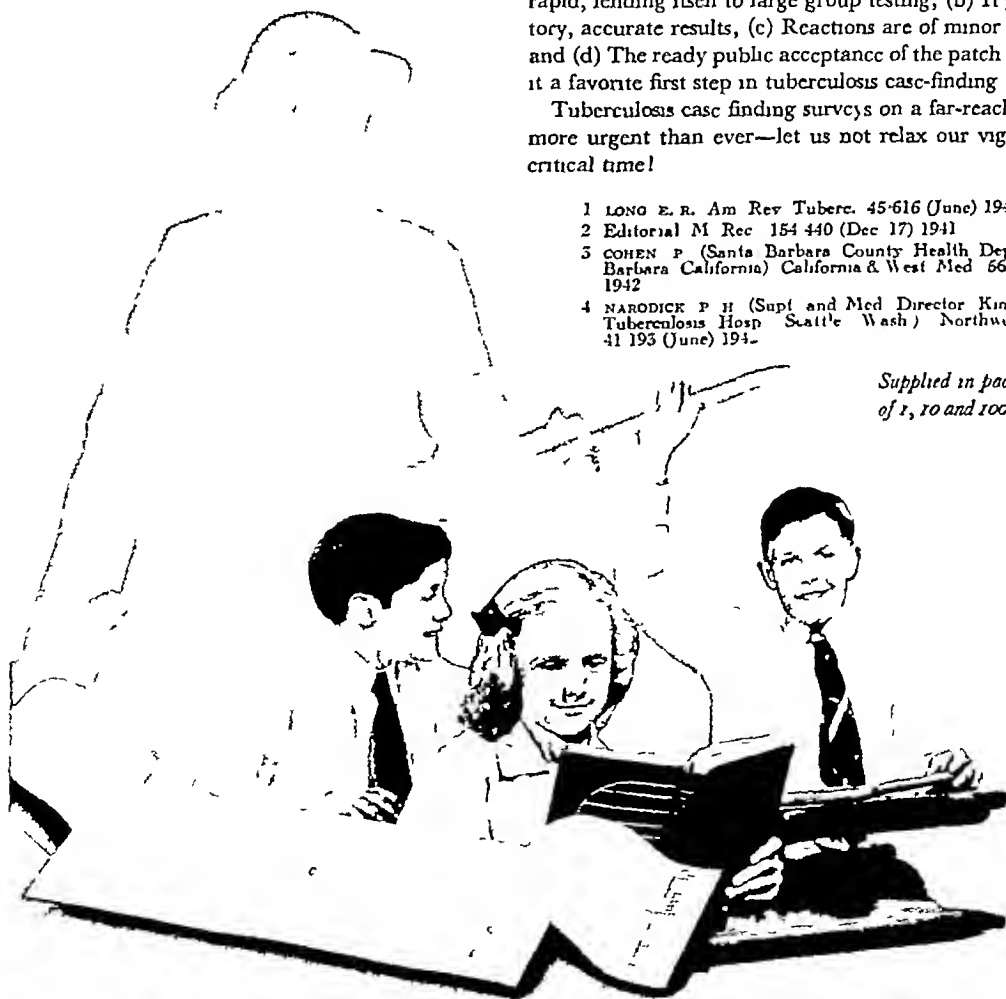
1 LONG E. R. *Am Rev Tuberc.* 45:616 (June) 1942

2 Editorial *M Rec* 154:440 (Dec 17) 1941

3 COHEN P. (Santa Barbara County Health Dept. Santa Barbara California) *California & West Med* 66:70 (Feb) 1942

4 NARODICK P. H. (Supt. and Med. Director King County Tuberculosis Hosp. Seattle Wash.) *Northwest Med* 41:193 (June) 1942

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## Editorial Comment

**Middle Atlantic States Issue** In conformity with a policy which was started at the inception of this

journal, one issue of *Diseases of the Chest*, is devoted each year to the presentation of a picture of sanatorium facilities and of the advances made in tuberculosis control in one state or in a group of states in this country

The following special issues have been published to date

1935 August, Vol I, No 6—New Mexico Issue

1936 May, Vol II, No 5—Missouri Issue

1937 June, Vol III, No 6—South Atlantic States Issue

1938 June, Vol IV, No 6—Pacific Coast States Issue

1939 October, Vol V, No 10—Mississippi Valley States Issue

1940 December, Vol VI, No 12—Ohio and West Virginia States Issue

1941 April, Vol VII, No 4—Southwestern States Issue

This year it is our privilege and pleasure to dedicate this issue of *Diseases of the Chest* to the District of Columbia and the States of Delaware, Maryland, Pennsylvania and New Jersey. The issue is to be known as the *Middle Atlantic States Issue*

Each of the States and the District of

Columbia have contributed scientific papers, dealing with subjects related to chest diseases, and written by physicians who are closely identified with the treatment of chest diseases

Each of these States and the District of Columbia have presented a picture through the printed word and by illustration, showing the present facilities for the treatment of the tuberculous

This issue of the Journal also carries the photographs of physicians in the District of Columbia and the States of Delaware, Maryland, Pennsylvania and New Jersey, who have pioneered in tuberculosis work or who hold office in the College. We pay tribute to these pioneers and leaders of the College and only regret that we do not have the space available to include the photographs of many more of the eminent physicians who have aided in this great cause

The Editorial Board of *Diseases of the Chest* expresses its appreciation to the State Chairmen under whose direction this issue of *Diseases of the Chest* was compiled, and also the officials of sanatoria, tuberculosis societies, and to all of the other individuals and agencies that have cooperated with us to make this issue of *Diseases of the Chest* possible

R C M

MIDDLE ATLANTIC STATES ISSUE

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DISTRICT OF COLUMBIA SECTION

**J WINTHROP PEABODY, M.D.**

WASHINGTON D C

President American College of Chest Physicians  
General Chairman Middle Atlantic States Issue**WILLIAM D TEWKSBURY, MD**

WASHINGTON D C

Chairman, District of Columbia Section, Middle  
Atlantic States Issue Governor, American College  
of Chest Physicians District of Columbia

## THE TUBERCULOSIS MOVEMENT IN THE DISTRICT OF COLUMBIA

The organized anti-tuberculosis work in the District of Columbia started about 1908 and was sponsored originally by Dr George M Kober who was Dean of Georgetown Medical School. Associated with him in the Tuberculosis Association in the early days were such well-known figures as George Sternburg Surgeon General of the U S Army and later Dr Harvey W Wiley who sponsored the Pure Food and Drug Act. It was through Dr Kober's efforts that an appropriation was obtained from Congress to build a Tuberculosis Hospital for the District of Columbia and this institution was opened in July 1908. The Tuberculosis Association maintained a chest clinic for Washington for a number of years and this was taken over by the Health Department about 1915. It has since been operated on funds appropriated by Congress. Dr W D Tewksbury was the first physician in charge of the Health Department Clinic followed by Dr J Winthrop Peabody and then by Dr A Barklie Coulter.

The Tuberculosis Association which obtains its funds from the sale of Christmas Seals has also financed a number of measures designed to reduce the tuberculosis rate. The association has financed x-ray films of school

children paid salaries for additional visiting nurses and has always been in the foreground in urging Congress to appropriate additional funds and enact necessary legislation which would improve the control of tuberculosis in the District of Columbia. They have financed the Health School and the Health Camp—both for incipient tuberculosis in children. The Association has also sponsored programs for the Medical Society and for radio. Mrs Ernest R Grant was for many years executive secretary of the District of Columbia Tuberculosis Association and she was succeeded by Mr Harald Lund, who is now in office. At the present time Dr J Winthrop Peabody is president of the Association.

The death rate for tuberculosis in the District of Columbia was cut in half from 1908 to 1918 but there was an increase in the rate among the colored population from 1920 to 1924. In recent years Congress has been more liberal with funds for the Health Department Chest Clinic. This has probably resulted in a further lowering of our death rate but there is still a great deal to be done before tuberculosis can be entirely eradicated or at least reduced to a minimum.

# District of Columbia Sanatorium



## GLEN DALE SANATORIUM

Unit B

GLENN DALE, MARYLAND

Glenn Dale Sanatorium, Glenn Dale, Maryland, was formed by combining the Children's Tuberculosis Sanatorium located at Glenn Dale, Maryland, with the Tuberculosis Hospital of the District of Columbia, located in Washington, D. C. The children's building (now known as Unit B) was opened at Glenn Dale in September 1934, and the adults unit (now known as Unit A) was moved from Washington to Glenn Dale in September 1937. There are approximately 100 beds for children and 585 beds for adults in the institution. Due to the increased demands for beds for adults, both units now admit adults but children are admitted only to Unit B. Patients of all races and denominations, male and female, of all ages with all types of tuberculosis and all stages of the disease are admitted.

Complete medical service is provided for all patients by the resident medical staff, which includes a resident thoracic surgeon. It is further supplemented by the services of a complete consulting staff in all the medical specialties. This consulting staff is composed of physicians practicing in the District of Columbia. The sanatorium is operated by the Health Department of the District of Columbia. Dr. William D. Tewksbury was Superintendent from February 1911, to September 1921. Dr. J. Winthrop Peabody was Superintendent of the institution from September, 1921, to August, 1939. Dr. Daniel Leo Finucane has been Superintendent and Medical Director from August, 1939, to date.

## The Treatment of Acute Pulmonary Abscess

WILLIAM D. TEWKSBURY, M.D., F.A.C.P.

and E. RAYMOND FENTON, M.D.

Washington, D. C.

Following our original report in 1917<sup>1</sup> of the cure of two cases of acute pulmonary abscess by the use of artificial pneumothorax, there were a number of reports that were favorable to this method of treatment. Among those so reporting were H. M. Rich,<sup>2</sup> Simon and Sweeney,<sup>3</sup> and O. M. Gilbert<sup>4</sup> of Denver.

Later reports have as a whole been less enthusiastic and recently even discrediting to this pneumothorax procedure for the treatment of lung abscess. Hever<sup>5</sup> in 1940 concluded a report saying that "the use of artificial pneumothorax for the treatment of lung abscess has proved unsatisfactory—it has a field of limited application and it not infrequently fails to achieve its purpose—and it is attended by the danger of pyopneumothorax."

Johnson et al.<sup>6</sup> reviewed 165 cases of lung abscess treated by this method and felt that pneumothorax had no place in the manage-

ment of lung abscess. He felt that a kinking of the bronchus draining the abscess might ensue and thus hinder rather than favor drainage.

At the present time there remain very few advocates of the pneumothorax treatment of lung abscess. Tewksbury<sup>7</sup> in 1918 reported ten cases. Of these, six (60%) were cured, two (20%) were temporarily cured and two (20%) died. He again reported<sup>8</sup> in 1925 on thirty-five cases treated with pneumothorax. Twenty-eight patients (80%) made a complete recovery. In three cases the abscess ruptured into the pleural cavity and surgical drainage through the chest wall produced a cure. Four cases died. One of these four died from an abortion and hemorrhage. In all, ten per cent of the cases reported died. The author stressed the small amount of air injected into the pleural cavity, advising only

one hundred fifty to two hundred cc of air given from two to five days apart. He found that usually six to seven treatments were necessary.

C L Herrell<sup>9</sup> of Norfolk, Virginia, reported in 1936 on twenty-three cases of lung abscess treated by pneumothorax. He had a complete recovery in twelve (52%) of the cases. This was the highest percentage of recoveries reported, using any other form of treatment. He used from one hundred fifty to three hundred fifty cc of air initially and in two to three days he increased the dosage to as high as 400 cc. Occasionally he got a positive manometric reading and usually a definite anatomical lung collapse.

We feel that pneumothorax has a definite place in the treatment of acute lung abscess. It must be understood, however, that we want drainage of the connecting bronchi—in contradistinction to the treatment of pulmonary tuberculosis, where we give larger doses with the hope and expectation of getting bronchial kinking and atelectasis. Corollys<sup>10</sup> has long used this hypothesis to explain closure of tubercular cavities. Most authorities agree with Corollys on this point. In the treatment of lung abscess with pneumothorax, very small doses of gas should be given. Seventy-five to three hundred cc is recommended for the purpose of partial reduction of the negative intra-pleural pressures. We want little or no anatomical collapse of the lung, so as to get no bronchial kinking. These small doses cannot be too strongly stressed for the successful pursuit of this method of treatment. We believe that the poor results obtained by many trying this procedure are due to too large doses, with too much collapse of the lung. This excessive collapse results in a kinking of the bronchus, leading to atelectasis more or less, with the tremendous risk of abscess rupture through the pleura. Since this form of treatment has been done largely by men accustomed to giving pneumothorax for tubercular cavities, it has been thought by many that the identical procedure would work for the non-tubercular abscess. This, we feel, is the error that has discredited pneumothorax for the treatment of lung abscess. The reason for such small amounts of gas, with practically no collapse of the lung, producing such dramatic results in very sick patients is difficult to explain.

Clinically, it promotes good drainage expectoration—which materially aids recovery.

*Case I—J A F* This patient was referred to us by Dr William Gill on April 18, 1939. He gave a history of pain in the back of the left chest and a bronchial cough with a bloody sputum that started early in March, 1939. The patient complained that the sputum had a bad taste at times. He lost ten pounds in weight in February and March of 1939. An x-ray taken on April 7, 1939, showed a large cavity out from the left hilus approximately in the middle of the lung. At the same time a sputum examination showed no acid fast bacilli.

One hundred fifty cc of air was given in the initial pneumothorax treatment on April 15, 1939. This dosage was increased to 225 cc on April 17, to 225 cc on April 20, to 300 cc on April 24, to 325 cc on April 30, to 350 cc on May 7, and 350 cc on May 14, 1939. An x-ray taken on May 13, 1939, showed a large area of infiltration in the region of the previous cavity with some suggestion of cavitation. No pneumothorax was visible on the x-ray. On the 24th of May, another x-ray made visible a partial pneumothorax showing the lung collapsed three-quarters of an inch at the base. At this point there is a small amount of fluid extending up the lateral chest wall for two thirds of its distance where it is lost at the angle of the scapula at the periphery. An x-ray taken on July 9, 1939, shows two and a half inches of collapse at the left base with some fluid and a partial pneumothorax of the lower half of the lung. He made an uneventful recovery.

*Case II—J G* This patient was referred to us by Dr Pickford on April 1, 1940. For the past two and a half weeks he had had a chest cold with a cough, but no expectoration. He had a stabbing pain in the left upper chest and back when he coughed. The patient was unable to raise his arm due to pain. The pain spread to both chest and back. The cough had been worse for the past week, but there was still no expectoration. He had a temperature accompanied by a cold feeling.

An x-ray taken on April 1, 1940, showed an area involving the left upper lung suggesting pneumonia or lung abscess. He was given a sulfa drug for three days with no benefit. He continued to run a high and septic temperature and for the first time coughed up

foul-smelling pus with some blood

Pneumothorax was begun April 3, 1940, with 150 cc. The treatment was repeated April 5 with 175 cc., April 7 with 200 cc., April 10, 200 cc., and April 14, 150 cc.

The patient had a normal temperature after the fourth treatment and was allowed to leave the hospital. He came to the office April 21 with practically no symptoms and the fluoroscope showed much improvement. He was given 125 cc of air. Mr. G. was asymptomatic at this time and insisted on going on a new government job that he "had to report for or lose." He did this against our advice.

When he again reported to the office, pneumothorax was attempted, but no space was found. An x-ray taken on May 12, 1940, showed some increased density of the left upper lung still persisting though much less than previously. No ulceration was present.

On June 5, 1940, the patient reported some return of the cough with some expectoration with a foul odor. Mr. G. was operated upon at Johns Hopkins Hospital on August 2,

1940, and the left lung was drained. The same day he had a hemorrhage from the wound and died.

This patient made a tremendous improvement following the pneumothorax treatment, and should have been a cured case. He had a fairly long period without symptoms and the failure of complete cure we attribute to his going to work too soon, and an inability to continue the pneumothorax over a long enough period of time.

**Case III—Miss A. R.** A fifty-three-year-old woman was referred to us by Dr. R. L. DeSaussure. She was first seen on Sept. 23, 1941. She had had a tonsillectomy ten days previously. Two days later she had a stitch pain under the right shoulder, but this subsided and she went back to work. She felt badly on Sept. 21 while at work, complaining of some stitch pain in the right chest and bloody expectoration and a temperature of 101.5 degrees. The original examination showed an acutely sick woman in bed, complaining of pain under the right shoulder on respiration and cough. The temperature was 103,



Case No 1 J A F, x-ray taken April 7, 1939 showing pulmonary abscess in center of left lung with large cavity

Case No 1 J A F, x-ray taken May 24, 1939, showing partial pneumothorax in the lower two-thirds of left lung with cavity practically closed. X-ray film taken one month later showed complete absorption of the abscess

pulse 97, blood pressure 145/65 There were no positive physical signs in the chest

An x-ray taken the following day showed an abscessed area on the right side from the level of the top first rib anteriorly to the bottom of the third rib anteriorly and involving one-fourth of the right lung field In the upper part of this area there was a suggestion of cavitation

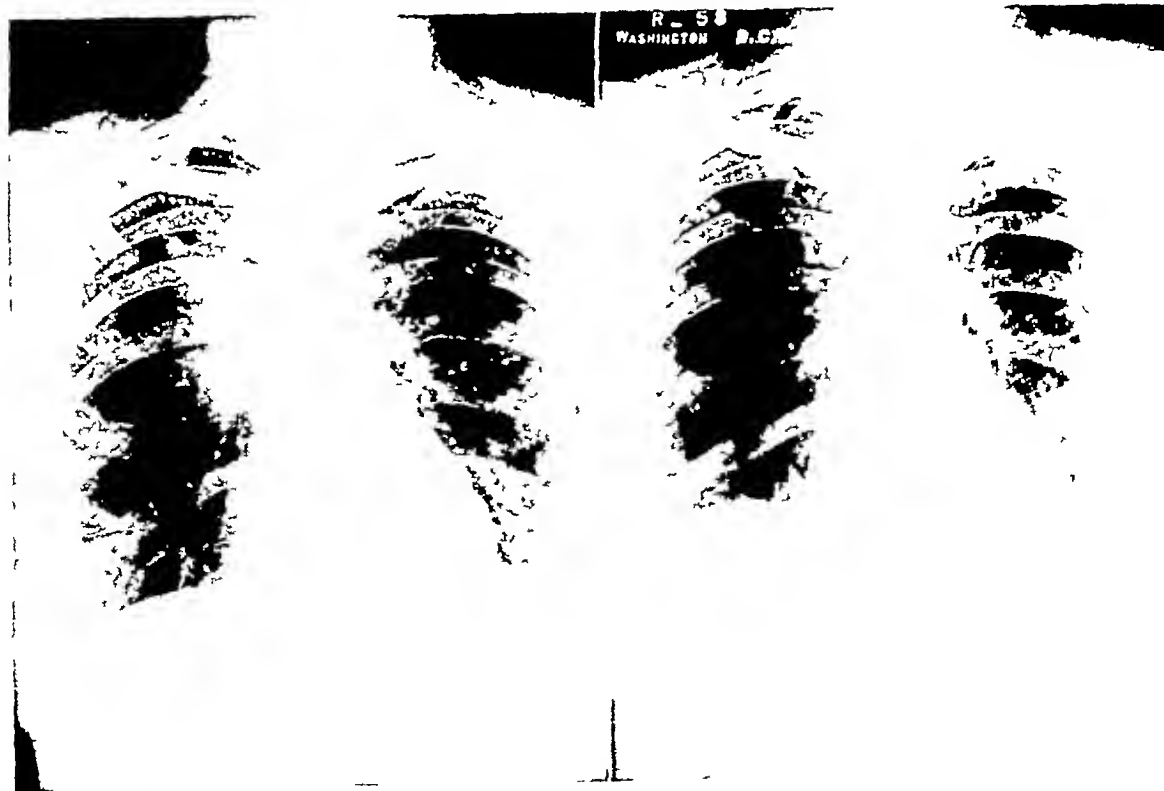
On Sept 25, 100 cc of air was given into the right pleural cavity with no untoward symptoms This was repeated on Sept 27 with 150 cc of gas On Sept 30, 175 cc was given and the patient had a normal temperature On October 3, 1941, the patient had a chill and the temperature rose to 103 degrees She complained of coughing and had a bloody purulent foul expectoration On October 4, 125 cc of gas was given One hundred twenty-five cc was given on Oct 10 at which time the patient was again feeling good with a normal temperature We gave her 200 cc on Oct 17 On this day we noted that she had a normal temperature for ten days with a small amount of expectoration, with some foul odor She was eating and feeling all right On Oct 24, 100 cc was given An x-ray film

at this time showed slight amount of scarring in the region of the second interspace, close to the sternum

**Case IV—Maj J B H** This patient was referred to us by Dr R L DeSaussure on January 21, 1938 He had a sub-mucous resection on Dec 3, 1937 Following this, he had some elevation of temperature He first noticed foul smelling and tasting pus about Dec 24, 1937

An x-ray film taken January 22, 1938, showed an area of increased density and consolidation involving the greater part of the right upper lobe, but not involving the apex above the clavicle Just below the second rib anteriorly in the periphery of the lung field, there was a fluid level in a fairly large-sized cavity

Pneumothorax was begun on the right side Jan 22, 1938, with 150 cc, January 24, 200 cc, January 30, 250 cc, and on February 3, 250 cc On February 4, the patient coughed up a large amount of bloody mucous and pus with temperature to 102 degrees Pneumothorax was given February 8 with 150 cc, February 12, 150 cc, February 17 the patient reported no cough and expectoration An x-ray on April



*Case No 3 Miss A R, x-ray films taken September 24, 1941, showing pulmonary abscess upper inner lobe of right lung*

*Case No 3 Miss A R, x-ray film taken one month later, October 4, showing complete absorption of the abscess*

27 showed normal lungs

*Case V*—Mrs E A K This patient was first seen by us on Oct 14, 1937. She had had a tonsillectomy three weeks previous to this. One week following this she developed a hacking cough, a pain in the upper right chest and an elevation of temperature. X-ray taken on Oct 11, 1937, showed a large lesion involving the right upper lobe with suggestion of cavitation. Artificial pneumothorax was done on October 14. One hundred fifty cc of air was used. Two hundred cc on the 16th of October, 250 cc on the 19th, 200 cc on the 23rd, 200 cc on the 29th, at which time her fever was reduced and she was feeling much better. Portable x-ray films taken at this time failed to show any pneumothorax, but showed quite a bit of clearing of the lesion, especially in the upper part. On November 1 she was given 300 cc, November 9, 250 cc. At this time her cough and expectoration had stopped and she was running a little low-grade temperature, less than 100 degrees. X-ray films taken on Dec 1, 1937, showed a small localized area between the second and third rib anteriorly, about the size of a quar-

ter. There was no evidence of cavitation. X-rays taken on Jan 8, 1938, showed still a slight amount of infiltration.

#### Summary

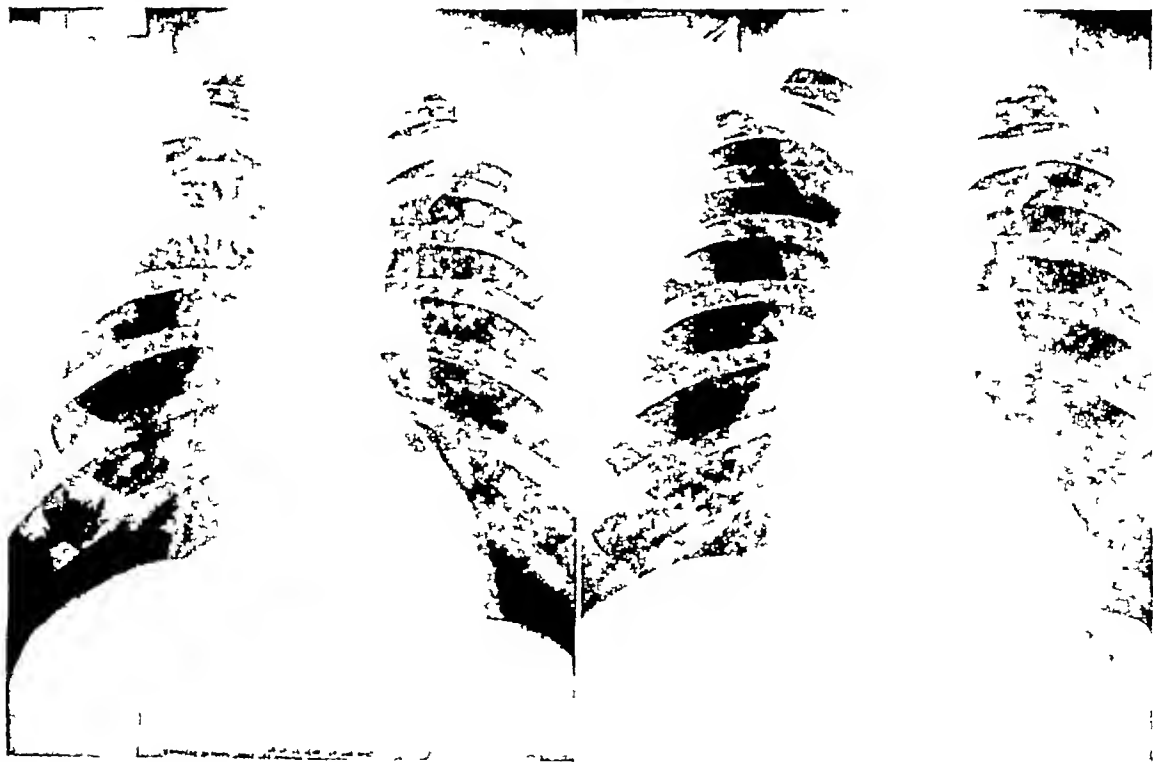
We have treated a total number of forty-five cases of acute pulmonary abscess with artificial pneumothorax since 1916. Of this number thirty-five, or 75 per cent, have recovered and four have died—a mortality of about 9 per cent. We feel the failure of other observers to obtain as good results has been due chiefly to the use of too large and too frequent doses of gas. Attempting to treat chronic abscesses of over two months' duration may also have contributed to less favorable results.

We feel that the use of artificial pneumothorax has a definite place in the treatment of acute pulmonary abscess.

#### References

- 1 Tewksbury, W D "Acute Pulmonary Abscess Treated with Artificial Pneumothorax," *J A M A*, 1917, 68, 770
- 2 Rich, H M "Acute Lung Abscess Treated by

(Continued on page 340)



Case No 4 Maj J B H X-ray film taken January 19, 1938, showing pulmonary abscess upper lobe of right lung with cavitation

Case No 4 Major J B H, taken April 27, 1938, showing abscess completely healed



## MIDDLE ATLANTIC STATES ISSUE

\* \* \* \*

## MARYLAND SECTION

Victor F Cullen M.D., State Sanatorium Chairman

History of the Tuberculosis Movement  
in MarylandWILLIAM B MATTHEWS, JR \*  
Baltimore, Maryland

Maryland is known as the cradle of the national fight against tuberculosis as it was the direct outgrowth of the tuberculosis exhibit of 1904 that the National Tuberculosis Association was formed.

This now historic exhibit was opened during the last week of January in 1904 with lectures, demonstrations, and conferences. The exhibit was divided into ten sections: statistics, tenements, state and municipal prophylaxis, hospitals and sanatoriums, books and portraits, domestic prophylaxis and house hygiene, district nursing, manufacturing exhibits, an exhibit of the National Sanatorium Association of Canada, and pathological anatomy, bacteriology and photography. The exhibition was surpassed only by the International Congress in 1908 and that was organized to a very considerable extent on the plan of the Baltimore exhibit.

Speaking on the work leading up to the exhibit of 1904, Doctor William Welch, on May 28, 1929, at the Founders' Dinner of the National Tuberculosis Association, said, "The exhibit is of historic interest and it is really the background on which was founded the Association. It was all due to Dr John S. Fulton. In 1901, it was decided to make a survey of the tuberculosis situation in Maryland with a view of securing on the basis of this survey an appropriate legislation. He visited Governor Smith in December 1901, and succeeded in interesting him so that the Governor recommended in his message in 1902 to our Legislature the establishment of a tuberculosis commission to make a study of the tuberculosis situation in Maryland."

The Commission was created, Dr William S. Thayer was made Chairman, John M. Glenn Secretary, and Dr Marshall Price replaced Dr Fulton during the time Dr Fulton was engaged in the Sixth International Congress on Tuberculosis.

The Commission at the end of two years had made a survey and made a preliminary report, and it was thought that the most effective thing to stir up popular interest would be to have an exhibit a tuberculosis exhibit. That exhibit was under the auspices of the Tuberculosis Commission of which Dr Thayer was the President, the Maryland Public Health Association, which was created by Dr Fulton in 1898, and the State Board of Health. They began to work on the exhibit in July, 1903.

Another direct result of the tuberculosis exhibit was the formation of the Maryland Tuberculosis Association. Doctor Henry Barton Jacobs served as its first president while Doctors Thayer, Welch, Fulton, and Osler were active in the organization's growth.

In 1904 the first tuberculosis visiting nurse was appointed and supported by a contribution of Mrs. William Osler. In 1908 two tuberculosis nurses were appointed by the Baltimore City Health De-

partment and this was increased to twenty in 1915.

In 1910, the City Health Department organized a Division of Tuberculosis and in 1912, two tuberculosis dispensaries were opened, and in 1913, a tuberculosis clinic was also opened.

Tuberculosis clinics were established in rural Maryland in the early 1920's with the joint cooperation of the Maryland Tuberculosis Association and the Maryland State Department of Health. In the beginning it was limited to a relatively few clinics. However, it has been expanded until today every county in the state with the exception of two have at least one clinic per month and in 1941, those two counties had a total of nine and eight clinics respectively.

In 1941, in the twenty-three counties of Maryland there was a total of 352 clinics which were attended by 7,002 patients of which 5,060 were white and 1,942 Negro. All of these clinics are equipped with x-ray facilities and all patients are x-rayed at the discretion of the clinician.

All case-finding work in the counties of Maryland is run in close cooperation with the County Health Department as the Association fits into their program of control no matter what it might be. In the past year the Maryland Tuberculosis Association has placed emphasis upon the x-raying of selected groups such as the National Youth Administration students, Juniors and Seniors of the various State Teachers' Colleges, and industrial workers.

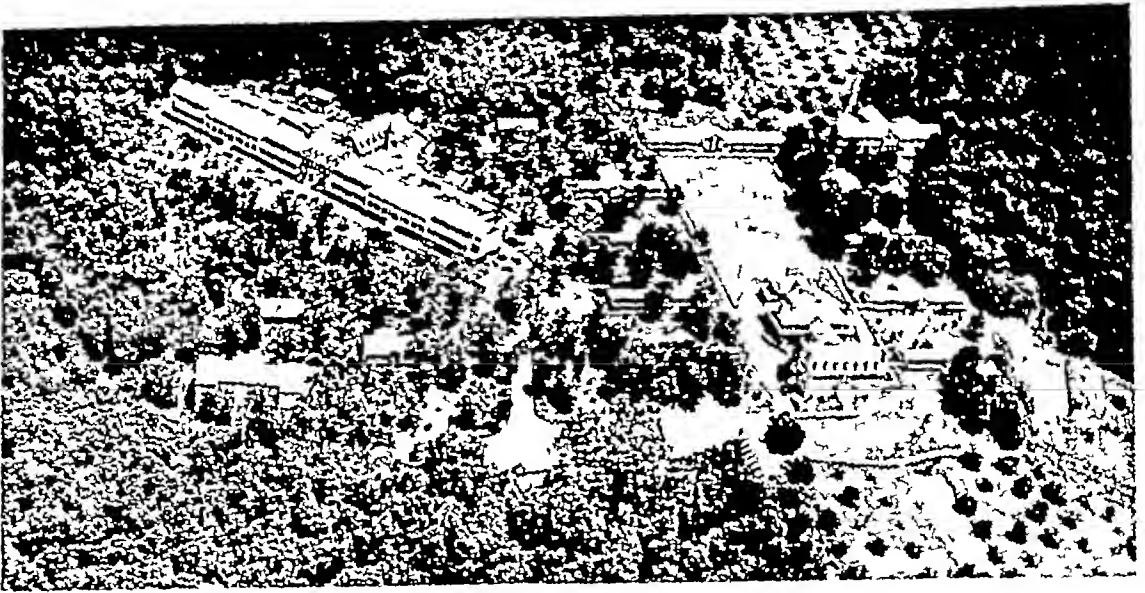
In Baltimore City, from September to December 31, 1941, the Maryland Tuberculosis Association at the request of the Selective Service Medical Director, x-rayed all registrants as part of their Local Board examination. This work was also carried on by the Association in the counties in cooperation with the county health officers. During this period there were 4,084 registrants x-rayed in Baltimore City of which 63, or 1.54 per cent were classified as 4F or unfit for military service because of tuberculosis. 2,095 or 51.8 per cent, had negative chest x-rays whereas 1,926 or 47.2 per cent, were classified as 1A but diagnosed as primary infection inactive. Of the total number 1,582, or 38.7 per cent were Negro while 2,502 or 61.3 per cent were white. Of the Negroes, 29 or 1.83 per cent were classified as 4F because of tuberculosis while among the white registrants 34 or 1.36 per cent were turned down because of tuberculosis. The figures for the counties are not available at this time.

The Baltimore City Health Department maintains a Bureau of Tuberculosis under the direction of a full-time medical director. The general program parallels that of the State Department of Health and as in all other activities there is a close cooperation between both departments as well as with the Maryland Tuberculosis Association.

(Continued on page 340)

\*Managing Director, Maryland Tuberculosis Association

# Maryland Sanatoria



## MARYLAND TUBERCULOSIS SANATORIUM

(Aerial View)

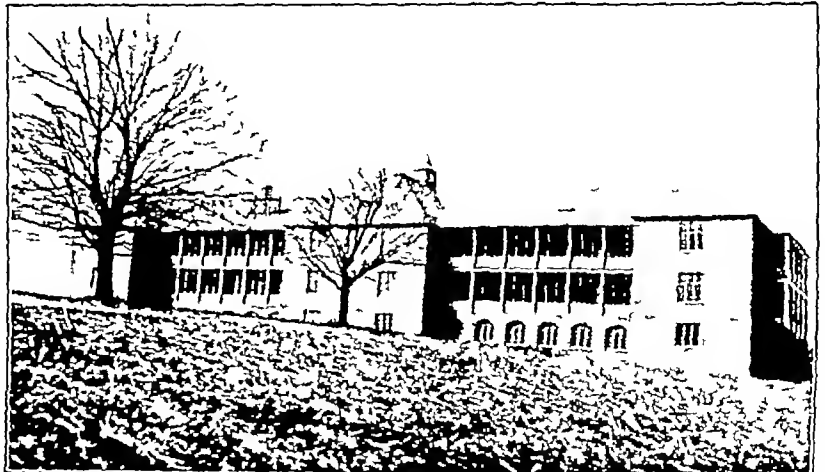
STATE SANATORIUM, MARYLAND

The Maryland Tuberculosis Sanatorium was first opened in 1908 for all stages of pulmonary and glandular tuberculosis. Children are admitted in a separate building. The total capacity of the sanatorium is 510. Diagnostic and

treatment facilities consist of x-ray pneumothorax, bronchoscopy, thoracoplasty and all types of thoracic surgery. Out-patient service available through the state department of health. Dr. Victor F. Cullen is Superintendent.

## MOUNT WILSON SANATORIUM

MOUNT WILSON,  
MARYLAND



HOSPITAL BUILDING

The Mount Wilson Tuberculosis Sanatorium was first opened in 1926 for all stages of pulmonary tuberculosis. Negro cases needing thoracic surgery are admitted into a separate ward. The total bed capacity of the sanatorium is 210. Treatment facilities and diagnostic facilities con-

sist of x-ray pneumothorax, thoracoplasty and all types of thoracic surgery. Out-patient department available for follow-up and case-finding. Dr. Stewart S. Shaffer is the Superintendent.

# Maryland Sanatoria



HOSPITAL AND MEDICAL BLDG

## EUDOWOOD SANATORIUM

TOWSON, MARYLAND

Eudowood Sanatorium incorporate name Hospital for Consumptives of Maryland was organized in 1894 and opened its doors for patients in the spring of 1896 in a small converted rented dwelling in Baltimore. In the fall of 1899 property was purchased and the institution moved to its present site. The bed capacity was 6 in Baltimore and 16 when first opened in the country.

Eudowood was among the pioneer institutions to offer free treatment to the indigent tuberculous and also to apply modern methods of treatment artificial pneumothorax having been instituted in the spring of 1911 by Dr Martin F Sloan, then superintendent.

The present bed capacity is 196 of which 48 are children including infants. The sanatorium is divided into 4 sepa-

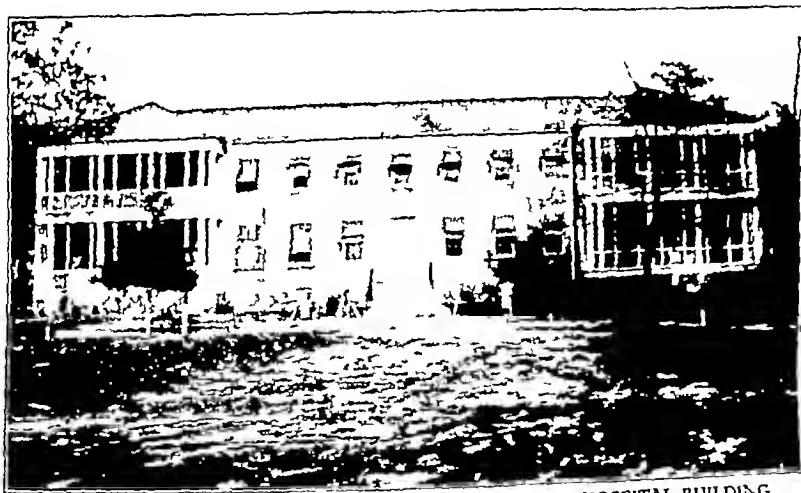
rate units: Hospital for advanced and the very ill patients; Sanatorium—cottages and infirmary—for ambulant and semi-ambulant; Convalescent Colony for prolonged treatment of chronic cases; and the Children's Hospital. There are 11 private rooms in the Medical Building.

The grounds consist of 347 acres of which 150 are in cultivation, on which there is a modern dairy and poultry farm. All milk and eggs are produced on the place. Forty acres are set aside for buildings and lawns.

The location is ideal, being 8 miles from the center of the city, 1 mile from Towson and the car line, a peaceful and restful place as the stem word of Eudowood means contentment.

## EASTERN SHORE TUBERCULOSIS SANATORIUM

SALISBURY,  
MARYLAND

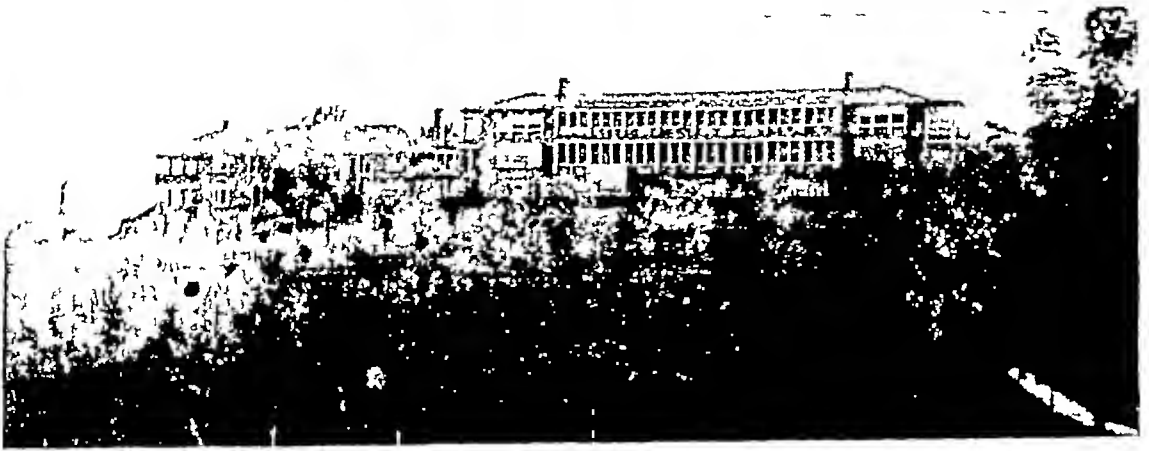


HOSPITAL BUILDING

The Eastern Shore Sanatorium was completed and opened in 1913 as the Pine Bluff Sanatorium. It was taken over by the Maryland Tuberculosis Sanatorium Commission in 1927. Children are admitted to the sanatorium and the total bed capacity is 78. Diagnostic and treatment

facilities available are x-ray, pneumothorax, and bronchoscopy. Cases requiring thoracic surgery are sent to Mount Wilson Sanatorium. The Superintendent of the sanatorium is Dr Paul Cohen.

# Maryland Sanatoria



## MOUNT PLEASANT SANATORIUM

REISTERSTOWN, MARYLAND

Mount Pleasant was founded by Mr Jacob Epstein of Baltimore in 1908 and then was known as The Jewish Home for Consumptives The capacity is 60 beds, for adults only All types of pulmonary tuberculosis are admitted who reside in the State of Maryland The sanatorium is completely equipped and has all modern appurtenances About 50 per cent of the patients are treated with some

form of collapse therapy It is located about 17 miles from the City of Baltimore in a beautiful rolling country, elevation about 850 feet above sea level The Medical Director is Dr Samuel Wolman who with a full attending staff makes regular visits to the institution Dr Albert F Shrier is the Superintendent



HOSPITAL BUILDING

## HENRYTON SANATORIUM

HENRYTON, MARYLAND

The colored branch of the Maryland Tuberculosis Sanatorium was opened in Henryton in 1923 It is a sanatorium exclusively for Negroes All stages of tuberculosis in any form are admitted Children are admitted in a separate building The sanatorium has a capacity of 485, of which 67 are children. Diagnostic and treatment fa-

cilities are x-ray pneumothorax, bronchoscopy, phrenic surgery and closed intrapleural pneumolysis Thoracoplasty is performed at the Mount Wilson Branch of the Maryland Tuberculosis Sanatorium and at Johns Hopkins and Baltimore City Hospital Dr Reuben Hoffman is the Superintendent

## The Tuberculosis Problem\*

### (A Challenge to the Private Practitioner)

REUBEN HOFFMAN, M.D. \*\*  
*Henryton, Maryland*

Is tuberculosis as important as the phthisiologists say it is? After all, tuberculosis ranks seventh among the leading causes of death. Why should it receive more attention than the six diseases that precede it? A careful examination of the problem is in order, since it is the contention of all individuals working in tuberculosis that the disease ranks first in importance both from the medical and public points of view.

Tuberculosis is still the leading cause of death between the ages of fifteen and forty, a span of life that comprises most of the productive years of an individual's existence. If mortality from tuberculosis is considered for race, and that is the immediate problem here, it ranks as the second leading cause of death. Deaths from tuberculosis, however, is not the only factor of importance, nor is it the only factor that makes the tuberculosis problem such a serious one.

Heart disease, cancer, cerebral accidents and nephritis, the first four ranking causes of death, are not contagious. One of these diseases may develop in an individual. The individual may die from it and that ends that particular disease in the particular individual. Not so with tuberculosis. One person contracts it and the number of infected individuals resulting will depend upon the number of people with whom that person has been in daily, intimate contact. On an average, at least three people are infected from one open case of tuberculosis. In an unfavorable, crowded environment, which is anything but unusual, any number may contract it.

In but few other diseases does the following picture occur. Father admitted with far-advanced tuberculosis and progresses to a fatal end. Before his death his wife and six-year-old daughter are admitted with far-advanced disease. Subsequent to his death, his four-year-old son is admitted with serious involvement. The remaining child is found

tuberculin positive, but does not require hospitalization. Another case. Mother contracts tuberculosis but refuses hospitalization. Shortly afterwards an eighteen-months-old child dies from tuberculous meningitis. The mother progresses unfavorably and finally agrees to hospitalization, dying ten days after admission. Within two months two sons, ages three and four, are admitted to the sanatorium and a third youngster is admitted to a general hospital. All the children have serious tuberculous disease. An older child, found tuberculin positive, is deemed able to continue without hospital care. The father miraculously escaped infection. These are not fairy tales, but actual case histories of families still in the sanatorium. They occur often. Consider the number of sanatoria that could present similar cases.

The mortality rate gives no information about the large number of individuals who are rendered chronic invalids and who become either a burden on their families or a problem of the welfare organizations conducted by the various governmental agencies.

The mortality rate gives no inkling of the number of tragedies that are rather frequent occurrences in a family following a death from tuberculosis, which not infrequently results in disruption of the home. This break-up of the home is usually encountered among the poorer class, where the burden of prolonged illness and removal of the chief wage-earner to the sanatorium is more of a load than can be carried. Deaths, desertions, the scattering of children to the homes of relatives or commitments to orphanages are encountered.

Nor from mortality statistics do we glean any idea concerning the tremendous cost associated with the care of the tuberculous. Huge sums from federal, state and municipal governments added to the tremendous loss of income from inability to work make the tuberculosis bill a staggering one. Lately, the public has become acquainted with and perturbed at the loss in man hours of work associated with strikes occurring in industry.

\*Read before the Third Annual Conference of Negro Tuberculosis Workers. Howard Medical School, Washington, D. C. June 10, 1941.

\*\*From the Maryland Tuberculosis Sanatorium (Colored Branch), Henryton, Maryland.

If the loss in man hours of work due to tuberculosis were computed, strikes would run a poor second. A worker who strikes loses but a few working days a year. A worker whom tuberculosis strikes usually loses a year or two of working days and not infrequently never returns to work.

Considered from all angles, the above facts should justify the opinion that tuberculosis ranks first in importance. Other diseases may cause more deaths, but not within the age period that is so important. Nor do they present the picture of chronicity, contagion, human tragedies and disruption of the home as does tuberculosis. These factors cannot be measured in money nor can they be gauged by statistics.

The problem is admittedly serious. It is rendered even more serious by an insufficient number of beds, the low economic condition of the average patient, a general lack of knowledge of the disease among the laity, and negligence and lack of interest on the part of many physicians.

The private physician has been frequently accused of a lack of knowledge and interest concerning tuberculosis. Is it true? Taking histories from hundreds of cases entering the sanatorium in a far-advanced stage of the disease frequently results in pointing the accusing finger at the private physician. It is common experience to find patients admitted to the sanatorium with extensive tuberculosis of long standing who have been under the care of their physician for some time. One stethoscopic examination of the chest and a prescription for a cough remedy seems to have been the sum total of the diagnostic procedures and therapy.

Further evidence\* that the physician fails to play his part can be gotten from a report recently submitted to the Health Commissioner of Baltimore. In the report it was pointed out that fifty per cent of the cases referred by private physicians to the city clinics for diagnosis had already progressed to a far-advanced stage of the disease, further, that physicians were responsible for reporting only twenty per cent of the new cases and that one-sixth of the cases re-

ported came to the attention of the Health Department for the first time through the medium of a death certificate.

Nearly all patients, at one time during the course of their illness, have been to their private physician with a complaint referable to their tuberculosis. Failure to make the diagnosis at that time, when the prognosis was good and the need for hospitalization relatively short, rests squarely at the door of the physician.

There are certain extenuating circumstances that exonerate the physician for part of the blame: his medical school education in reference to tuberculosis and the literature that he reads about tuberculosis.

Certainly few medical school graduates have anything but the faintest appreciation of the problem of tuberculosis that will confront them in the practice of medicine. It is suggested that the reorganization of the physicians' education start in school, where they should be taught facts about tuberculosis that are important and the problems that they will have to solve when they see tuberculosis in their practice.

Much of the literature that the physician reads about tuberculosis, when he reads any at all, contains articles that assure him that the mortality from tuberculosis is steadily falling and that in fifteen years or so the disease will disappear. It is recommended that such articles be ignored. They aren't true. Tuberculosis is not a disappearing disease. The implication from such an article is that granting a complete reawakening and a revolution in tactics, tuberculosis could be made unimportant in fifteen years. With the present set-up, tuberculosis will neither disappear in fifteen years nor one hundred and fifty years. It will never disappear.

It would be wishful thinking to suppose that there is going to be any immediate marked improvement in the tuberculosis set-up. More beds will undoubtedly be provided, more and better facilities for the detection of tuberculosis will be erected, and increasing information about tuberculosis among the laity will be made available. But these improvements take time. What can be accomplished must be accomplished with the present set-up, be what it may. And a good deal can be accomplished. The private physician can be educated in tuberculosis and when he is trained

\*A survey of the facilities for the prevention of tuberculosis in Baltimore, Md.—Allen W. Freeman, M.D., School of Hygiene & Public Health the Johns Hopkins University, Oct 31, 1940

to utilize all the facilities for diagnosis he will represent the most important source for the detection of early tuberculosis. When a method for the systematic detection of early tuberculosis has been organized, the answer to the problem is at hand, since the detection and treatment of the early case is the only hope for the eradication of the disease.

Where are the facilities for the detection of early tuberculosis just referred to? The physician's office. The patients who cross the threshold into the physician's office constitute a large and obviously important group for case-finding. Something is wrong with them, otherwise they wouldn't be in the physician's office. The most obvious group where tuberculosis should be suspected and looked for is in patients seeking medical advice. The material for case-finding is at hand, the remaining step is to take advantage of it.

Should the physician consider every patient who enters his office as a tuberculosis suspect? Why not? One out of every hundred people in the country has tuberculosis. In selected population groups, where the incidence of the disease is high, it may be as high as one out of every twenty. Whatever the percentage is, it is obviously worth the effort it takes to find it. One case of tuberculosis, it must be repeated over and over, does not constitute the total danger of the disease. Human beings are gregarious and tuberculosis is contagious.

How is a diagnosis of early tuberculosis made? Reference to the advanced case is purposely omitted, since the diagnosis is obvious. The detection of the far-advanced cases will no more solve the tuberculosis problem than locking the stable door after the horse has been stolen will prevent the theft of the horse. The ideal time to make a diagnosis is before the sputum has become positive, since this means, in nearly all cases, cavity formation. Since the onset of tuberculosis is usually insidious and since the disease can progress to a serious degree before the patient becomes aware that anything is wrong, the early case will not infrequently escape detection. Symptoms of early disease are too vague and simulate too many other conditions to be a reliable guide. The detection simply requires a routine examination of every patient who enters the physician's office with the purpose of proving the presence or the

absence of tuberculosis.

For such a plan the least expensive and simplest method is tuberculin testing. Nearly every person who has been infected with tubercle bacilli will give a positive reaction to the cutaneous or intracutaneous administration of tuberculo-protein. If the result of the test is negative, the patient without pulmonary symptoms can be dismissed as not having tuberculosis. At this point it should be emphasized that the negative test does not guarantee that the patient will always remain free from tuberculous infection. A diagnosis of "non-tuberculous" holds good for only that time at which it is made. It gives no inkling of future infection.

Should the test be positive, and it frequently will be, and should the patient have any signs or symptoms that suggest a respiratory infection, an x-ray of the chest should be taken. The x-ray is specified and not the stethoscope, because it is understood that early tuberculosis is being considered. The stethoscope is a satisfactory implement for the detection of obvious tuberculosis, but an unreliable instrument if solely used to detect early disease. There is nothing more false or more dangerous than the attitude "I can't hear anything, therefore the patient doesn't have tuberculosis." If that physician will go to any sanatorium, he will see many plates of early disease where the physical examination of the chest was negative. He will also see plates showing manifest tuberculosis with cavitation where, too, the physical examination of the chest was negative. And here the examination of the chest was performed by a physician trained in the stethoscopic examination of the chest.

The detection of early tuberculosis is frequently difficult even with the use of x-rays. At times it requires prolonged observation with repeated check-ups. If in doubt, why not call in the man trained in tuberculosis work? Why not consider tuberculosis a disease that requires specialized knowledge and experience? General practitioners don't hesitate to call a surgeon for a suspected acute abdomen, they shouldn't hesitate to call the phthisiologist for an opinion on a chest plate or about a patient. There is no truth to the commonly implied and frequently expressed opinion that tuberculosis doesn't require specialized knowledge and training. It does. A



physician can't read five plates and consider himself qualified. Nor fifty, either. For the sake of the patient it is advisable to consider the diagnosis of early tuberculosis frequently difficult, even if the general practitioners don't, the specialists in the sanatoria do.

The pulmonary lesion may be extremely small according to the x-ray and yet present a sputum heavily loaded with tubercle bacilli. The bacillary concentration of sputum is variable and may on occasions become negative for a time. Frequently, many sputum examinations, supplemented by cultures of the stomach washings and sputum, are required before a positive result is obtained. Health Department laboratories are staffed with competent bacteriologists. All the physician has to do is to give the patient the container with instructions about its use.

A patient who is hoarse for any length of time should be suspected of having a tuberculous laryngitis and x-ray of the chest and sputum examinations become imperative. If the physician automatically, without any examination, called all the cases of chronic hoarseness tuberculous laryngitis, he would be painfully surprised to learn how often he would be right.

Pulmonary tuberculosis still remains the most common cause of blood-spitting. Usually the diagnosis is obvious. Sometimes the diagnosis is anything but obvious. A case of blood-spitting may not be tuberculous in origin, but the physician should demand x-ray proof that it isn't.

Pleurisy, with effusion particularly, is like blood-spitting, it is tuberculous unless it can be proven to be something else. It commonly requires a culture or guinea pig inoculation of the aspirated fluid to prove it, but again, regardless of its appearance it will be, quite commonly, found tuberculous. Tuberculous pleurisy should be treated as a case of minimal tuberculosis and put to bed until the acute phase subsides. The patient should be carefully watched and checked periodically, since a significant percentage of these cases are followed within a few years, many earlier, by pulmonary disease.

Whether a tuberculous pleurisy should be hospitalized in a sanatorium is a moot question. An environment away from tubercle bacilli is unquestionably preferable. Granting a good environment, the patient is just as

well off at home, provided the potential danger of the pleurisy is appreciated.

The onset of tuberculosis is not uncommonly acute. It can simulate grippe. Beware of the acute respiratory infection that doesn't subside within the customary interval of time!

The treatment of tuberculosis can be dismissed with a sentence. Active tuberculosis can be safely treated only in a sanatorium. Tuberculosis is a treacherous and dangerous disease and treatment should not be carried out by anyone not familiar with its many-sided clinical and pathological manifestations. It should be remembered that tuberculosis almost invariably affects the lungs, but at the same time may and commonly does affect any part of the body. Complications are not limited merely to the far-advanced case and are more liable to occur under inexperienced care.

Education of the tuberculous patient along with the family is of prime importance and not difficult to carry out. Here the physician can accomplish more in one talk than can be accomplished by many other means.

He should, after the diagnosis has been made, convince the patient that prompt hospitalization is necessary. He should persuade every member of the family to be examined, for by this method he may find the source of the infection or detect the infected contacts.

Physicians should keep in touch with their sanatorium patients by visiting them when possible. A visible boost in the patients' morale is observed after such a visit. By this display of interest in the patient, physicians could be of value to the sanatorium staff in combatting that too frequent occurrence of patients leaving against advice or seeking leaves of absences to their homes for the purpose of straightening out minor domestic disturbances. The family, as often as the patient, is hard to convince that this is harmful.

It would be better if physicians refrained from telling patients how long the period of hospitalization will be, because he usually errs considerably on the conservative side. Many of the patients enter the sanatorium with the assurances of their physicians that only three months or so of hospitalization will be necessary. When they learn that three months usually marks just the beginning,



they are cruelly disappointed and frequently discouraged

When physicians take a greater interest in their tuberculosis patients hospitalized in the sanatoria, spend time in educating them and their families about the disease, a large number of individuals (the ones who need it and will profit by it) will be reached with vital information. It can be done and offers an important source for the propagation of information about the disease, so badly needed.

The patient's discharge from the sanatorium does not constitute the end of the disease. Patients must be closely watched and many rehabilitated. Unless both of these necessary steps are systematically arranged and carried out, a good deal of the accomplishments of the sanatorium will have been in vain, or at best, will have to be repeated.

Here, too, the physician can play an important role. Trained, he will be able to help combat the most disheartening of all occurrences, reactivation and spread of the disease.

Tuberculosis, an extremely serious disease from both the medical and public health points of view, taking a terrific toll of human lives, frequently crippling those whom it doesn't destroy, necessitating an enormous outlay of money, both public and private, is a preventable disease. To prevent it, it must be looked for. The private physicians see larger numbers of sick people than any other agency. They must be trained to be tuberculosis conscious, if progress is to be made, and they can and should be the first line of defense.

#### THE TREATMENT OF ACUTE PULMONARY ABSCESS

(Continued from page 331)

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| <p>Therapeutic Pneumothorax," <i>Am J M Sc</i>, 1922, 169, 428</p> <p>3 Simon and Sweeney "An Acute Pulmonary Abscess Treated by Artificial Pneumothorax," <i>Am Rev Tuberc</i>, 1918, 2, 92</p> <p>4 Gilbert, O M <i>Colorado Medicine</i>, 1920, 138</p> <p>5 Hever, George J "Acute or Recent Pulmonary Abscess," <i>Surg Gyn and Ob</i>, 1940, 70, Part I</p> <p>6 Johnson, Pyle, and Shull "The Non-Surgical Management of Lung Abscess," <i>So Med J</i>, 1940, 33, 1245</p> <p>7 Tewksbury, W D "Treatment of Non-Tuber-</p> | <p>culous Lung Abscess with Pneumothorax," <i>J A M A</i>, 1918, 70, 293</p> <p>8 Tewksbury, W D "Acute Pulmonary Abscess Following Tonsillectomy Treated with Artificial Pneumothorax," <i>Annals Cl Med</i>, 1925, 4, 347</p> <p>9 Herrell, C L "Suppurative Condition of the Lung Treated by Artificial Pneumothorax," <i>Va Med Mo</i>, 1936</p> <p>10 Coryllos, P N "Mechanism and Biology of Tuberculous Cavities," <i>Am Rev of Tuberc</i>, 1936, 33, 639</p> |
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#### HISTORY OF THE TUBERCULOSIS MOVEMENT IN MARYLAND

(Continued from page 332)

tion. The Tuberculosis Association has equipped two city clinics with x-ray machines and plates and has just purchased two 4 x 5 machines, one to be used in the Druid Health Center which is in the center of the Negro district of Baltimore, and the other to be used in the Eastern Health District.

The annual death rate per 100,000 population for the total population of the state has declined from 202.1 in 1914 to 71.3 in 1940. In the white population the death rate has declined from 157.5 in 1914 to 44.9 in 1940, and among the Negro population has declined from 405.6 in 1914 to 204.0 in 1940.

As can be seen, the emphasis must be put upon the Negro and to this end all organizations have striven. The State of Maryland has just increased the capacity of the colored branch of the Maryland State Sanatorium by approximately 100 beds

which will give an approximate figure of 11 beds per Negro death. The Tuberculosis Association has for years carried on a teaching clinic for Negro physicians at the Provident Hospital in Baltimore. In the last two years, in cooperation with the District of Columbia and Virginia Associations, as well as the American Social Hygiene Society, it has sponsored a three-day post graduate seminar for Negro physicians. Special emphasis on Negro health education has been stressed by all organizations.

The trend in the tuberculosis death rate in Maryland is in part ascribed to improvement in the economic status and to a diminishing amount of community infection in consequence of education, case finding, and hospitalization. These are some of the factors within our control and if used to their fullest extent, should encourage the belief of a continued decline in the extent of the disease.

## MIDDLE ATLANTIC STATES ISSUE

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DELAWARE SECTIONL D Phillips M D Marshallton Delaware, *Chairman*The Delaware Tuberculosis Campaign  
The Christmas SealL D PHILLIPS, M.D.\*  
*Marshallton, Delaware*

In 1904, at the suggestion of Dr John J Black of New Castle, a meeting was called by the late Bishop Coleman at Bishopstead for the purpose of considering what could be done for the tuberculous cases in Delaware. Those present at this meeting were Bishop Coleman, Drs Albert Robin, Joseph P Wales, Irving M Flinn, John J Black, P W Tomlinson, Ralph Stubbs, also Mrs Ferdinand Gillpin, Mrs Jane Pennewill, and Mrs Fenn. At this meeting, the Delaware Anti-Tuberculosis Society was founded with Dr Black as president and Dr Wales as secretary.

Subscriptions were begun, which eventually netted around \$4,000 00. With this money a shack was built on the meadow along the Brandywine Creek on ground belonging to the late Mr Alfred I duPont. This shack consisted of quarters for eight patients with a bath in the center of the building.

In 1907 the financing of the care of these patients became quite acute, and Dr Wales consulted Miss Emily P Bissell relative to the raising of funds to continue this work. Miss Bissell at that time was on the editorial staff of the *Outlook* and secretary of the Delaware Chapter of the American Red Cross, and had been greatly impressed with an article which appeared in the July issue of the *Outlook*, by Mr Jacob Riis, describing the origin of the Danish Christmas Stamp or Christmas Seal, by Mr Einar Holboell. Mr Holboell was a postal clerk in Copenhagen, Denmark, and while engaged in stamping hundreds of letters and packages all carrying messages of good will and happiness for the Christmas season, had a thought "Why not put a tax on the mail and thereby obtain extra revenue

to be used for some philanthropic purpose?" For children—children ill with tuberculosis? The tax should be small, he figured, and should carry something tangible as a reminder that the money was to help bring greater Christmas joy to many sick boys and girls. The Christmas Stamp, as it was called, was the result of his thinking. He aroused the interest of various prominent citizens, who in turn secured the consent of the reigning King Christian IX to honor the memory of the late Queen Louise by using her picture on the stamp. The Government's only stipulation was that the stamps should be different in shape and size from regular postage stamps and the Minister of the Interior granted permission to sell the stamps in the post offices throughout Denmark. They were printed in sheets of fifty and sold for 90 oere or if sold separately they were 2 oere each, about half a cent.

And so that first Christmas Seal sale was held in 1904, December 6 to January 6. In the little country of Denmark everybody soon heard of this new way to help sick children and all were eager to buy and use the stamps. That first year over four million were sold, representing an average of about two for every man, woman and child in the country, and the sum of 68,000 kroner was raised.

Miss Bissell realized what the closing of the shack would mean to these patients and their families. She made up her mind that money must be raised. "Why not try the Christmas Seal device in Delaware?" Again it was persistence, vision and a sincere belief in the penny emblem that were responsible for Miss Bissell's first Christmas Seal sale in America. She designed a seal with a holly wreath, and persuaded two women friends to loan \$20 00

\*Superintendent, Brandywine Sanatorium

each to pay for the printing of 50,000 stamps. She secured the interest of the post office, women's clubs, newspapers and shopkeepers who promised to help, and on December 9, 1907, at a table in the corridor of the Wilmington Post Office a girl in Red Cross uniform sold envelopes enclosing 25 seals each to all passersby. On the envelope was printed this message:

## 25 CHRISTMAS STAMPS

One Penny Apiece

*Put this stamp, with message bright,  
On every Christmas letter  
Help the tuberculosis fight,  
And make the New Year better*

These stamps do not carry any kind of mail  
but any kind of mail will carry them

The sales were good even after the enthusiasm of the first day died down. Miss Bissell, however, realized she could extend the sale further and turned to the Philadelphia *North American*, popular newspaper at that time for all nearby cities and towns. There was a columnist on that paper, Leigh Mitchell Hodges, who shared her vision and put the story into every paper from then on through Christmas. It was he, too, who guaranteed to sell all her 50,000 stamps, telling her to print more. They were put on sale in the street floor office of the newspaper. Mr. Hodges told the story in many ways, with a five-column head on the first page of the paper, with editorials and with news stories.

From Jacob Riis came this message to Miss Bissell on December 19: "Good for you and for the Philadelphia *North American*. Keep it up. I am glad the little seed I sowed in the *Outlook* last summer has borne fruit."

One incident of the first sale has become historic through Mr. Hodges' telling, that of a little ragged newsboy. Reaching up to the marble counter higher than his head, this grimy child put down his penny, saying, "Gimme one. Me sister's got it." "Those seven words settled it," says Mr. Hodges in an article thirty years later published in the *Reader's Digest*. "If a street kid could get the message, the messenger was the kind we needed."

That first sale netted Miss Bissell far more than her fondest dreams had anticipated. Three hundred dollars had been her goal to save the shack, but \$3,000.00 was raised, \$1,013.97 from the *North American's* sale alone. Delaware was thoroughly convinced

of the need for tuberculosis work and through state appropriations a state tuberculosis commission was created.

The following year, Miss Bissell, still making history, personally planned a publicity campaign and circularized 6,000 newspapers all over the United States. An army of volunteers enlisted, and by this enthusiastic effort \$135,000 was raised in this first national campaign. In Delaware, a farm was purchased two miles west of Marshallton on which site the present state sanatoria for white and colored patients is now located. Following the purchase of this farm the original shack was moved from the Brandywine to this location, also smaller additional shacks were erected.

In 1909 an appeal was made to the Delaware State Legislature and it allotted \$15,000 a year for the treatment of tuberculosis. The Delaware Tuberculosis Commission was appointed to supervise the tuberculosis problem in the state. Mr. Joseph Bancroft was elected president, and Dr. Harold Springer was elected secretary. It was the function of this commission to select the suitable cases for admission to the sanatorium, and to maintain the patients in the institution. This commission also established tuberculosis clinics throughout the state, the majority of these clinics are still operated by the State Board of Health.

In 1911 the Jewish Welfare Society donated a building to the Brandywine Sanatorium. The Catholic Daughters of America also added a brick building about this time.

In 1912 a campaign was conducted for the raising of funds for the present main building. Mr. Pierre S. duPont gave the greater part of the money for the erection of this building. Following its construction, the other buildings and shacks were used for the housing of the staff and help.

No provisions had been made previously for the colored tuberculous patients. In 1915 money was appropriated by the Legislature for the care of these cases. A building on the grounds of the Delaware Anti-Tuberculosis Society was used for this purpose. This was the first sanatorium in the United States and, in fact, in the world, for the treatment of colored tuberculous patients. About two or three years later the Legislature granted money for the purchase of grounds and the erection of a sanatorium for these colored patients. The ground was purchased and a

sanatorium was erected one mile from the Brandywine Sanatorium. The large farm house on the Brandywine grounds was then renovated for the preventorium for children, which is now known as Sunnybrook Cottage.

With the increasing demands upon the Delaware Anti-Tuberculosis Society, the financing became a difficult task so that in 1925 the society offered the sanatorium to the State of Delaware gratis, if the state would assume the responsibility for its future operation. That year the Legislature accepted the responsibility and placed the operation of the sanatorium under the State Board of Health.

The demand for admission to both sanatoria continued to grow, thereby requiring additional buildings. Today Brandywine has two main buildings for adults and a children's building, with a total bed capacity of 160, while Edgewood which received money from the State Legislature to erect a new building, opened in January 1940 on the Brandywine grounds, has a bed capacity of 68.

Previous to the first Christmas Seal sale only eight states had active tuberculosis associations. The Christmas Seal, however, stimulated state after state to organize groups of men and women who in turn influenced local groups to carry on campaigns in their own communities. By 1917 every state in the Union had its own tuberculosis association and together, led by the National Tuberculosis Association, conduct their country-wide well-organized program.

On the twentieth birthday of the Christmas Seal, Miss Emily P. Bissell received congratulations from many of her friends throughout the country. Col. Charles A. Lindbergh flew from Wilmington to Philadelphia, taking from her a package of Christmas Seals which he delivered to the Mayor of Philadelphia—the first Christmas Seals to go on sale there that year.

In 1936, the year of the thirtieth Christmas Seal sale, an anniversary luncheon was given in her honor in Wilmington, Delaware, with Leigh Mitchell Hodges as toastmaster. Almost 500 men and women were present to

pay tribute to the continuous and devoted service Miss Bissell has given to the tuberculosis movement. Hundreds of telegrams and messages of congratulation were sent to her, not only from this country, but from many foreign lands where Christmas Seals are sold.

In November, 1937, two nations and the Tuberculosis Associations of the United States honored Miss Bissell—the "Lady of the Christmas Seal."

On the site of one of the early cottages for tuberculosis sufferers, now the home of the Brandywine Sanatorium, scores of men and women from all parts of the country gathered for the unveiling of the bronze plaque, erected by the Tuberculosis Associations of the United States. A national and state committee on arrangements for the program represented every section of the Nation. One of the principal guests at the exercises was Dr. Otto Wadsted, Danish Minister to the United States, in whose country the first Christmas seal of the world was started. He unveiled the tablet. The bronze tablet has this legend:

"This tablet commemorates the founding of the first Christmas Seal in this country by Miss Emily P. Bissell of Wilmington, Delaware, December, 1907. From small beginnings, the annual Christmas Seal sale has financed the development of the organized fight against tuberculosis, in every state, resulting in saving thousands of lives. Erected by the Tuberculosis Associations of the United States, December, 1937."

Miss Bissell has been president of the Delaware Anti-Tuberculosis Society since 1907—and under her leadership the society has been a very important factor in the fight waged against tuberculosis in the state. For several years the state has enjoyed the highest per capita return from its seal sale of the forty-eight states.

According to the records of the statistical department of the State Board of Health—Delaware's tuberculosis death rate in 1910 was 184 per 100,000 population, in 1941 it was 55.



## Tuberculosis Pioneers in Delaware



**JOHN JANIER BLACK, M.D.**  
NEW CASTLE DELAWARE  
1873-1909

First President Delaware Anti-Tuberculosis Society



*(Photo by Wm Sheuall Ellis)*

**MISS EMILY P BISSELL**  
WILMINGTON DELAWARE

President Delaware Anti-Tuberculosis Society

## Officers of the College



**LAWRENCE D PHILLIPS M.D.**  
MARSHALLTON DELAWARE

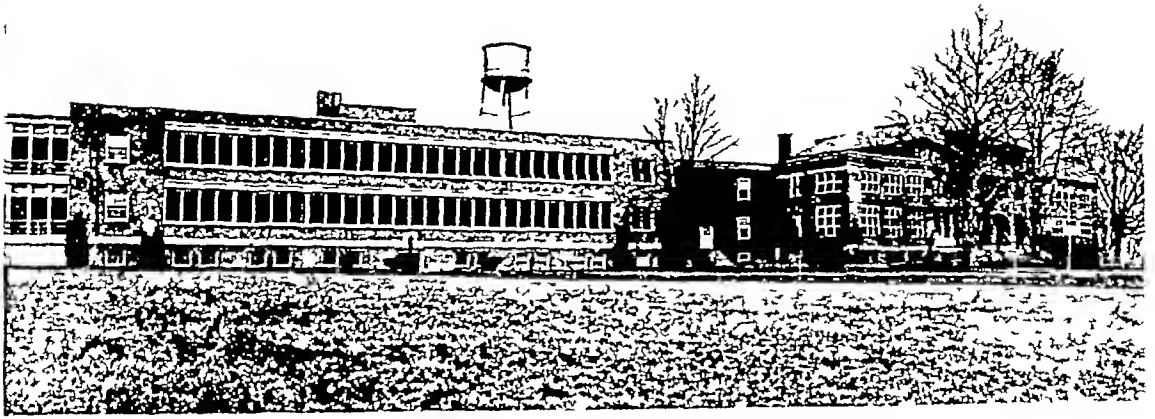
Chairman Delaware Section Middle Atlantic States  
Issue Acting Governor American College of Chest  
Physicians



**CAPTAIN GERALD A BEATTY (MC)**  
WILMINGTON DELAWARE

Governor American College of Chest Physicians Dela-  
ware (On military leave)

# Delaware Sanatoria



## BRANDYWINE SANATORIUM

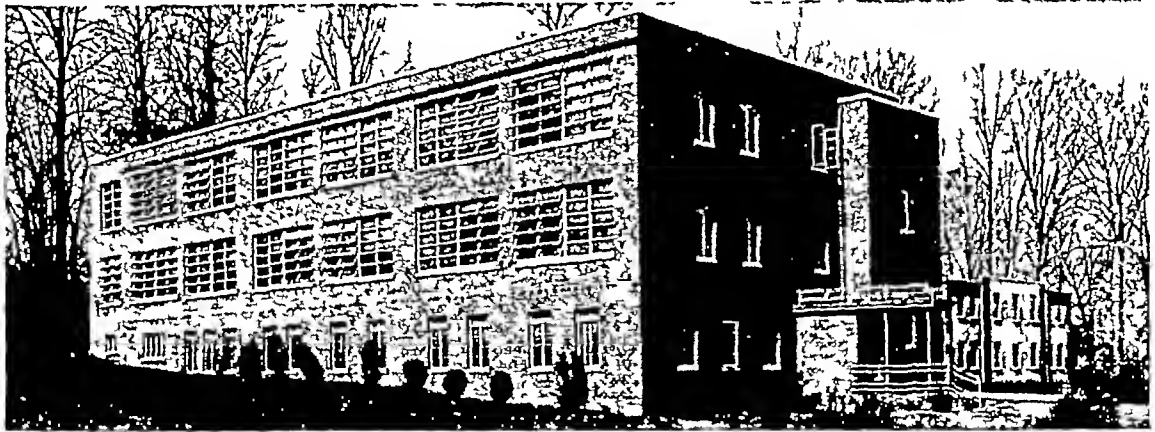
MARSHALLTON DELAWARE

The present sanatorium had for its beginning a wooden shack for the care of eight tuberculous patients, situated on ground along the Brandywine, belonging to the late Mr Alfred I duPont. The present site was purchased in 1907 and the original shack was moved to this new site, as well as additional small units being constructed one by the Catholic Daughters of America and another by the Jewish Welfare Society.

The present administrative building was erected in 1912. In 1927 the buildings and grounds were donated to the state by the Delaware Anti-Tuberculosis Society who had

operated the sanatorium since its beginning. The state has added a 36-bed children's hospital and a 48-bed infirmary building as well as necessary facility and staff buildings. The present capacity is 160, 124 adults and 36 children.

All forms of tuberculosis are admitted. An in-and-out-patient pneumothorax department is maintained at the sanatorium while other operative procedures are done at the Memorial Hospital in Wilmington. Only bona fide state residents are admitted. Dr L D Phillips is the Superintendent and Medical Director.



## EDGEWOOD SANATORIUM

MARSHALLTON, DELAWARE

Edgewood Sanatorium located near Marshallton, Delaware, was the first sanatorium in the United States to be manned by an entirely Negro staff. It was made possible by the same untiring workers who were responsible for the establishment of Brandywine Sanatorium for white patients in Delaware. The question of the establishment of some care for the colored tuberculous in the state was first discussed in 1912 under the leadership of Miss Emily P Bissell, President of the Delaware Anti-Tuberculosis Society. Among the other pioneers who assisted were John J Black, M.D., Bishop Coleman, Mrs Ferdinand Gilpin, Mrs. Jane Pennewill, A Robin, M.D., Joseph P Wales, M.D., Irvine M Flinn, M.D., and Peter W Tomlinson, M.D. In 1913, the State Legislature appropriated \$10,000.00 with the provision that the Delaware Anti-Tuberculosis Society

was to raise a like sum. This was accomplished and in 1914 a unit was provided at Hope Farm (Brandywine Sanatorium) for colored patients. In 1915, the first Edgewood Sanatorium was opened. In the latter part of 1940 the new Edgewood Sanatorium made possible by the appropriation of \$150,000.00 by the State Legislature, was opened. It has a capacity of 68 (62 adults, 6 children). The Medical Director is Conwell Banton, M.D., and the Acting Superintendent is Miss Rachel B Connor, R.N. The sanatorium is for bona fide state residents. All forms of tuberculosis are admitted. There is an in-and-out-patient pneumothorax department, while other forms of surgery are done at the Memorial Hospital, Wilmington, Delaware.

# FOR VICTORY



**BUY**  
UNITED  
STATES  
DEFENSE  
**BONDS**  
AND  
**STAMPS**



Russell S Anderson M D Erie Pennsylvania *Chairman*

## Pennsylvania—A Pioneer

RUSSELL S ANDERSON, M.D.\*

*Erie, Pennsylvania*

The year 1942 witnesses the accomplishment of fifty years of organized effort against tuberculosis in Pennsylvania. Much that our generation possesses in the way of resources designed to wage war against the ancient plague had its genesis in the Keystone State. One may go further and localize some of our beginnings in the venerable city of Philadelphia. Here were not only the cradle of American liberty and the seat of the first medical school in the land, but also the birthplace of organized opposition to the ravages of consumption.

Prior to fifty years ago, Pennsylvania shared the common lot and took tuberculosis as a matter of course. Koch's discovery of the tubercle bacillus had been known for ten years yet impressive health measures to crystallize the import of his discovery had yet to appear. Practically nothing had been done by any agency, public or private, to either prevent the disease or to effectively treat those who had become its victims. Hospital facilities were almost negligible and preventive measures were simply an absent quantity. Despite the fact that tuberculosis was by far the leading cause of death at that time, official health boards paid virtually no attention to the problem, anti-tuberculous legislation was a rarity and only an occasional physician manifested noticeable interest in its presence. What was true of Pennsylvania up to that time had been equally true throughout the nation, with the possible exception of two or three localized communities.

Out of this void there arose in Philadelphia in the year 1892 an organization whose basic principles and early activities had done much to point the way to a succeeding campaign against tuberculosis. In that year, a few physicians and forward-looking laymen, under the stimulation and guidance of the late Dr. Lawrence Flick of Philadelphia, organized the Pennsylvania Society for the Prevention of Tuberculosis. This organization, which in 1920 changed its name to the Pennsylvania Tuberculosis Society and which also observed its fiftieth anniversary in Philadelphia in June of this year, immediately set about the task of educating the medical and lay public as to the known truths of tuberculosis. This involved the preparation of vast amounts of printed matter and addresses to medical societies and lay organizations. Every effort was made to stimulate proper control legislation and to encourage the development of hospital facilities for the care of the tuberculous sick.

The young organization struggled along for eighteen years before its financial support began to grow appreciably. Nevertheless, it accomplished much with the meager tools at its disposal during the interim. One of its greatest achievements was an indirect one. Taking precedent from the result of Philadelphia and Pennsylvania's initiative, similar organizations began to appear elsewhere in the United States and

throughout the civilized world. One of these was the National Tuberculosis Association, organized in 1904. Here, then, were the beginnings—and the accomplishments of these groups to date are too well known to need repetition here.

Pennsylvania was also a pioneer in the development of facilities required for the isolation and care of tuberculous patients. Again the name of Dr. Flick enters into the early picture, although his efforts were not the very first. In 1869 a valuable piece of property including a substantial dwelling or two, was offered in Chestnut Hill Philadelphia, as a haven for those "afflicted with consumption." Legend has it that this novel idea was born of spite rather than charity and was intended to mar the tranquility of that staid aristocratic and mid-Victorian suburb—mute evidence of the low regard held for tuberculosis at that time and the stigma placed on individuals suffering from the disease.

Whether this not too pretty tale is true, such an institution nevertheless actually developed on the premises. The Protestant Episcopal Mission of Philadelphia acquired the property and founded The Home for Consumptives some years later. This institution flourishes to this day and has in the years between offered sanctuary to thousands of hapless victims of tuberculosis.

Just prior to his successful contribution in the organization of the Pennsylvania Society for the Prevention of Tuberculosis Dr. Flick succeeded in forming the Rush Hospital for Consumptives and Allied Diseases. This institution was opened in 1892. Two years later the Free Hospital for Poor Consumptives was founded at White Haven and again the hand of Dr. Flick together with the collaboration of the Reverend Father Scully, was responsible. As an outgrowth of this valuable undertaking, Dr. Flick became associated with the industrialist, Henry Phipps. Together in 1903 they founded the Henry Phipps Institute from whence so much of scientific achievement has come these many years.

It is of interest to note here that this long flourishing institution has not only done remarkable work among the poor of Philadelphia but has produced some of the most outstanding clinicians and teachers in the tuberculosis field in this state. Very high on the list among these was the late Dr. H. R. M. Landis whose biography and achievements appear elsewhere.

By this time it was apparent that the tuberculosis question burned most urgently in the homes of the poor. If a successful fight was ever to be waged against the disease tax-supported institutions must be brought into the picture. The eminent champion and father of this cause was the late Secretary of State, Department of Health, Dr. Samuel G. Dixon. Largely through his efforts, the sanatorium known originally as South Mountain Camp Sanatorium, opened in 1902 at Mount Alto, became a state institution in 1907. This is

*(Continued on page 360)*

\*Medical Director, Erie County Tuberculosis Hospital.



# Tuberculosis Pioneers in Pennsylvania



**SAMUEL GIBSON DIXON, M.D**

BRYN MAWR PENNSYLVANIA

1851 1918

State Commissioner of Health, Pennsylvania, 1905 to 1918



**LAWRENCE F. FLICK, M.D**

PHILADELPHIA PENNSYLVANIA

1856 1938

Organizer and First President, Pennsylvania Tuberculosis Society



**HENRY R. M. LANDIS, M.D**

PHILADELPHIA PENNSYLVANIA

1897 1937

Director Clinical and Sociological Department, Henry Phipps Institute



**WILLIAM DEVITT, M.D**

ALLENWOOD PENNSYLVANIA

1874

First President, Federation of American Sanatoria (1935-37) (now American College of Chest Physicians)

Photographs of Drs. Dixon, Flick and Landis through the courtesy of the American College of Physicians

# Officers of the College in Pennsylvania



**RUSSELL S. ANDERSON, M.D.**

ERIE PENNSYLVANIA

Chairman, Pennsylvania Section Middle Atlantic  
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**FRANK WALTON BURGE, M.D.**

PHILADELPHIA PENNSYLVANIA

Chairman Board of Regents (1938-42) Editor-in-  
Chief DISEASES OF THE CHEST (1937-1941)  
Member Editorial Board.



**C. HOWARD MARCY, M.D.**

PITTSBURGH PENNSYLVANIA

Regent American College of Chest Physicians, Dis-  
trict No 3

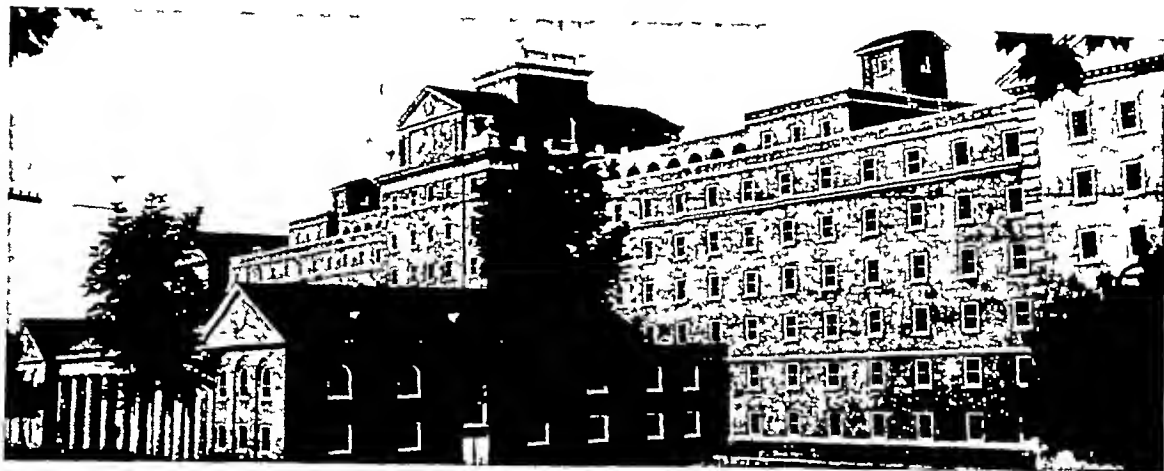


**JOHN H. BISBING, M.D.**

READING PENNSYLVANIA

Governor American College of Chest Physicians  
Pennsylvania

# Pennsylvania Sanatoria



## PENNSYLVANIA STATE SANATORIUM, No. 1

SOUTH MOUNTAIN, PENNSYLVANIA

The Pennsylvania State Sanatorium for Tuberculosis No. 1 at South Mountain was founded in 1903. It is located in the center of a 55,000-acre state forest reservation in Franklin County, Pennsylvania, at an elevation of 1650 feet.

The main structures of this institution are the Adult Hospital Building, modern and completely equipped with a capacity of 765 beds; the Children's Hospital with a capacity of 330 beds for children between the ages of four

and sixteen years.

In addition, there are four modern brick units with 49-bed capacity each for the care of ambulatory patients and also 58 of the Samuel Dixon cottages, each accommodating eight patients, designed by Samuel G. Dixon, who organized and was first Commissioner of Health of Pennsylvania, making a total capacity for the institution of 1750 beds. Dr. C. C. Custer is the Medical Director.



## PENNSYLVANIA STATE SANATORIUM, No. 2

CRESSON, PENNSYLVANIA

Pennsylvania State Tuberculosis Sanatorium has 850 beds and was opened December 1912. There is a special building for children which includes twenty-five beds for infants over eighteen months. Adult patients in all stages of pulmonary tuberculosis are admitted regardless of distinction of color or age. An addition now under construction will provide two modern operating rooms with neces-

sary adjuncts and housing for twenty-four surgical patients. This building will probably be ready for occupancy in Autumn of 1942.

The sanatorium was built and is operated by the State Health Department and maintained entirely by state appropriation. There are no charges of any kind. Dr. Thomas H. A. Stites is the Medical Director.

# Pennsylvania Sanatoria



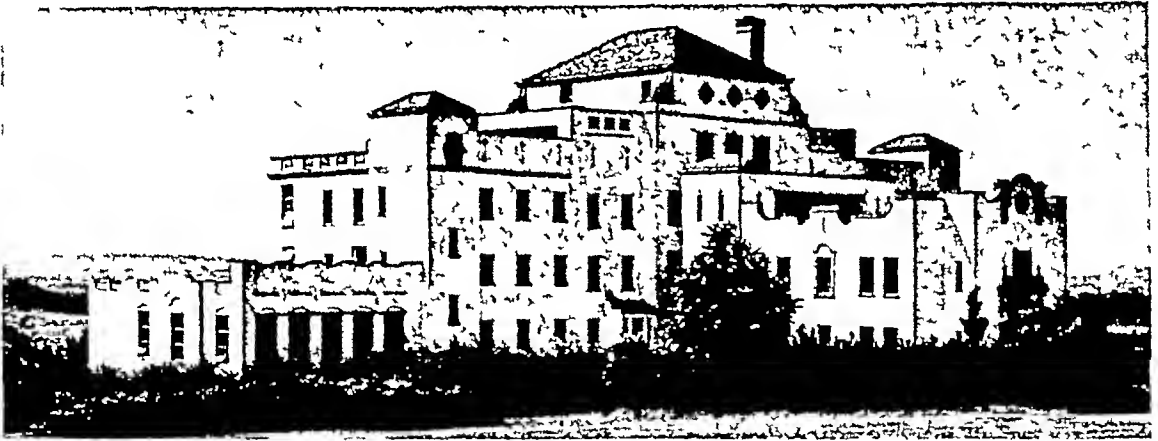
## HAMBURG STATE SANATORIUM

HAMBURG, BERKS COUNTY, PENNSYLVANIA

In October, 1914, this institution, located on a tract of more than three hundred acres and with a capacity of 450 beds, received its first patients. The sanatorium is a complete unit, with power plant, water and sewage treatment plants, laundry, bakery and farm.

Admissions to date have totalled more than 20,000. In 1932, two units for ambulatory cases were constructed

adding 90 beds, four additional units with a combined capacity of 200 beds as well as a nurses home, were completed in 1938 and during the same year a complete surgical unit with 36 beds and two air-conditioned operating rooms was dedicated, since which time major chest surgery has been practiced. The present capacity is 776 beds. Dr. Henry A. Gorman is the Medical Director.



## EAGLEVILLE SANATORIUM

EAGLEVILLE, PENNSYLVANIA

The Eagleville Sanatorium is situated in the beautiful Perkiomen Valley, twenty-three miles from Philadelphia and three miles northwest of Norristown. It is designed and equipped for the care of patients suffering from pulmonary tuberculosis, all forms. The capacity is 200. There is a modern fireproof hospital with complete operating facilities, eight cottages, a central dining hall and a central power plant, all equipped in the most modern fashion.

Arrangements can be made for the reception of patients in all economic levels. There are 150 free and part-pay beds and 50 beds for private patients.

The dispensary, social service department and executive

offices are located at 1332 Fitzwater Street, Philadelphia.

The medical staff includes recognized tuberculosis specialists in Philadelphia who visit weekly and some of the finest specialists in the collateral branches of medicine. There are two resident physicians and a corps of expert nurses. Sixty-five to seventy per cent receive some form of collapse therapy.

The institution is maintained by state aid and the Philadelphia Community Chest board from patients and income from endowment funds. Dr. A. J. Cohen is the Medical Director.

# Pennsylvania Sanatoria



## ERIE COUNTY TUBERCULOSIS HOSPITAL

ERIE, PENNSYLVANIA

The Erie County Tuberculosis Hospital is a county institution, located immediately south of the City of Erie

The first patient was admitted on January 26 1938 There is a bed capacity of 65 of which nine are in private rooms and all but eight of the remainder in four-bed wards

The Erie institution follows the principle of strict pro-

longed rest supplemented by the intense use of collapse therapy in a very high percentage of cases The clinical work is supported by the institution's own x-ray and clinical laboratories and dental and dietetic departments

Dr R S Anderson has been the Superintendent and Medical Director since the hospital opened There is a large consulting staff



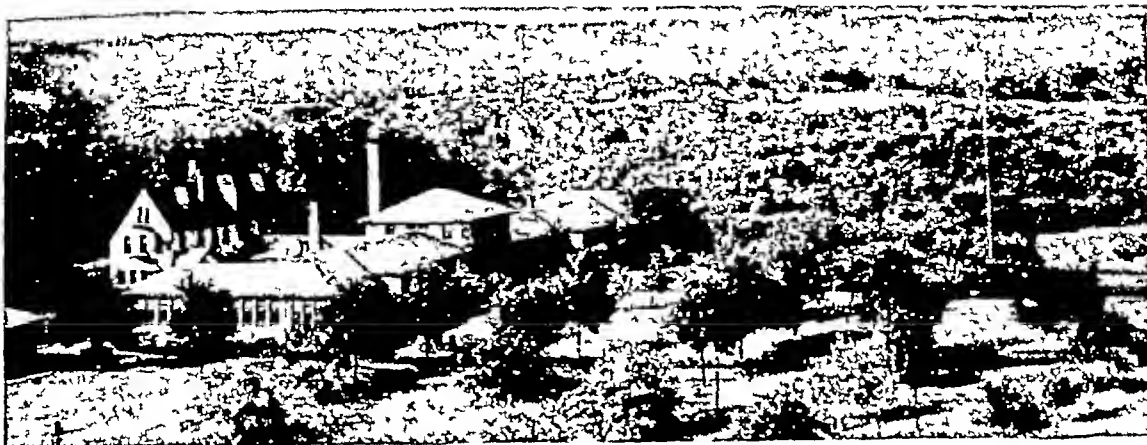
## ROSSMERE SANATORIUM

LANCASTER, PENNSYLVANIA

Rossmere Sanatorium was first opened in 1925 It is a semi-private sanatorium admitting all stages of tuberculosis in any form, limited to residents of the state Diagnostic and treatment facilities are x-ray pneumothorax cases requiring thoracoplasty are transferred to local hos-

pitals or to Pennsylvania Hospital and Jefferson Hospital in Philadelphia Out-patient service provided by Tuberculosis Society of Lancaster County Dr Murray K. Spillman is the Medical Director

# Pennsylvania Sanatoria



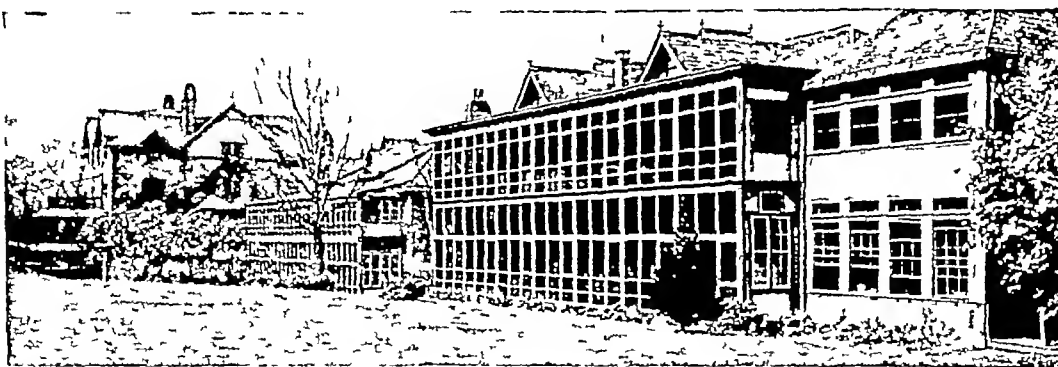
## BEAVER COUNTY SANATORIUM

MONACA, PENNSYLVANIA

Beaver County Sanatorium Monaca Pennsylvania, was opened in 1923 and houses sixty patients Only pulmonary tuberculosis cases are admitted in all stages of disease All types of collapse therapy are used in treatment Patients must be over sixteen years of age, residents of

Beaver County for a year or more of any race religion or creed First patient was admitted on February 8 1924 and since then 1724 patients have been treated

Margaret Boal R.N, is the Superintendent and Dr Ruth W Wilson is the Medical Director



## THE HOME FOR CONSUMPTIVES

CHESTNUT HILL, PENNSYLVANIA

The Home for Consumptives is the oldest sanatorium for the treatment of tuberculosis in the United States

The first patients were admitted in 1877 and it has been in continuous operation at its present location for the past sixty-five years

Patients are admitted in all stages of the disease

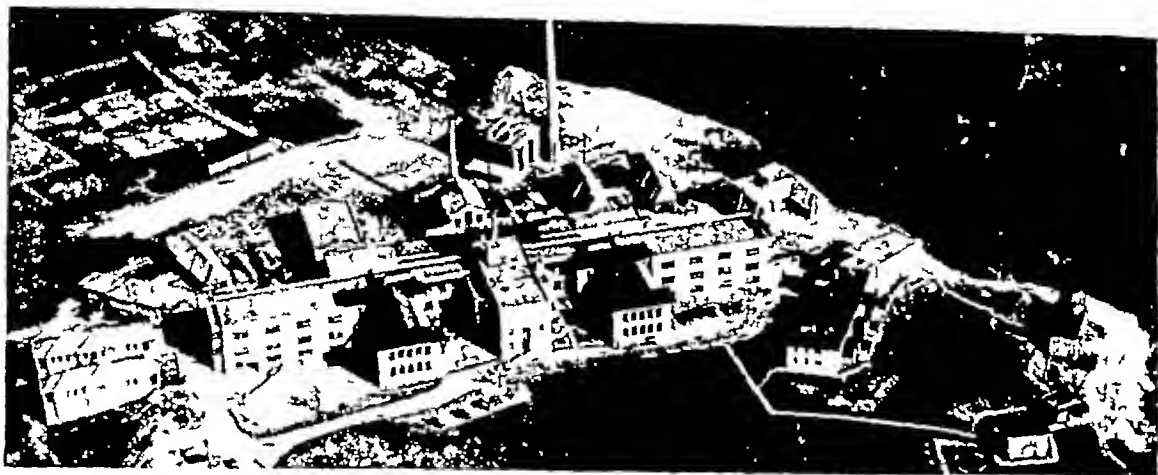
All modern methods of treatment, including thoracic

surgery are employed by a complete staff of specialists

The sanatorium is operated by the Episcopal City Mission of Philadelphia but is non-sectarian regarding patients The rates are very moderate

For information concerning admission of patients address Episcopal City Mission 225 South Third Street Philadelphia Pa

# Pennsylvania Sanatoria



## PITTSBURGH TUBERCULOSIS HOSPITAL

PITTSBURGH, PENNSYLVANIA

The Pittsburgh Tuberculosis Sanatorium was opened in September 1915 with a capacity of 125 beds. Pittsburgh thus became the first city in the State of Pennsylvania to have its own hospital for the treatment of tuberculosis. It is situated on a plateau overlooking the Allegheny River.

The sanatorium is equipped with a radio system consisting of a central station and individual ear phones at each

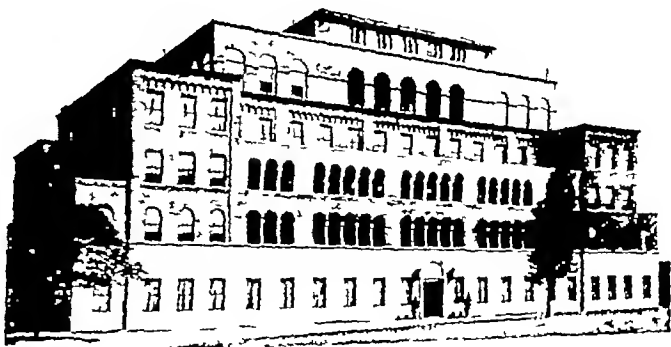
bed. There is also a theatre with a seating capacity of 300.

The bed capacity has been increased and in 1939 was 460 beds. Obstetrical service has been added to the regular activities of the hospital and modern x-ray and operating rooms installed.

Dr. George E. Martin is the Superintendent of the Pittsburgh Tuberculosis Sanatorium and Dr. I. Hope Alexander is Director of the Department of Public Health.

## THE TUBERCULOSIS LEAGUE HOSPITAL

PITTSBURGH, PENNSYLVANIA

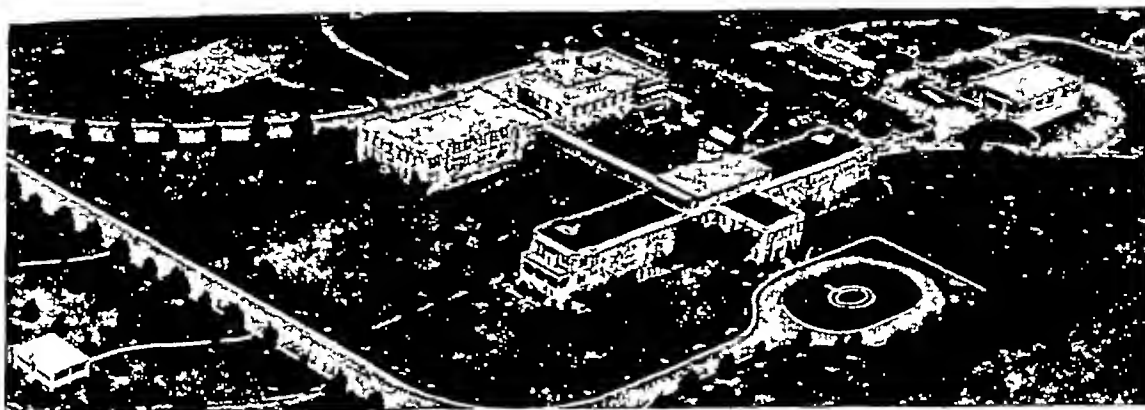


The Tuberculosis League Hospital, located 1100 feet above sea level, only one mile from the heart of a great industrial city, yet having spacious grounds, has an advantage unique in the field of tuberculosis prevention. Departing from the usual practice of establishing a base far distant from the source of patients, the League has

developed an organization whose many ramifications are coordinated and guided from one point in the midst of a population of 1,500,000. The buildings are designed to make possible a complete diagnostic and treatment service for the 150 hospital patients and for the 6,000 patients who annually visit its out-patient department.



# Pennsylvania Sanatoria



## BERKS COUNTY TUBERCULOSIS SANATORIUM

READING, PENNSYLVANIA

The Berks County Tuberculosis Sanatorium, located in Bern Township six miles west of Reading Pennsylvania had as its beginning the Neversink Mountain Sanatorium founded in 1910. In 1932 following construction of a new modern hospital the Neversink Sanatorium was abandoned and the new quarters occupied.

The sanatorium is supported entirely by county tax funds and admission of patients is limited to residents of

Berks County in accordance with the legislation that governs operation of county sanatoria.

Equipped in the manner of a general hospital and with facilities for the accommodation of 138 patients the Berks County Sanatorium is prepared to treat all forms of tuberculosis or its complications, either medical or surgical. Dr. John H. Bisbing is the Superintendent.



## WHITE HAVEN SANATORIUM

WHITE HAVEN, PENNSYLVANIA

White Haven Sanatorium admitted its first patients at its present site in the Pocono Mountains (at White Haven, Pa.) in 1901. The sanatorium had been organized six years earlier by Lawrence F. Flick, M.D., one of the early pioneers in tuberculosis who continued his association with the hospital staff until his death in 1937.

With a bed capacity of 240, facilities are available for 125 patients with private accommodations in single and two-bed rooms. Beds in community buildings are not available because of excessive demands.

The resident medical staff is under the direction of Christian W. Nissler, M.D.

The hospital facilities comprise the most modern and complete equipment for the treatment of tuberculosis combined with the services of a staff of consulting physicians and surgeons eminent in their respective specialties.

Harold T. Prentzel, Fellow of the American College of Hospital Administrators and President of the Hospital Association of Pennsylvania, is Administrator of the sanatorium. Competent specialists who have met the requirements of their fields supervise the x-ray laboratory, dietary, nursing, pharmacy, farm, pasteurization, engineering and maintenance departments.



Tuberculous Tracheobronchitis<sup>\*</sup>

LOUIS H. CLERF, M.D.  
*Philadelphia, Pennsylvania*

Although the pathology of tuberculous tracheobronchitis was described about one century ago, its clinical importance was not recognized until the last decade. This recognition is in great part attributable to bronchoscopy. The remarkable progress made in the field of tuberculosis by this diagnostic aid during the past ten years has conclusively answered the query—is bronchoscopy indicated in tuberculosis?<sup>1</sup>

Tuberculous tracheobronchitis is a specific inflammation of the trachea or bronchi caused by the tubercle bacillus. It must not be confused with tracheobronchial tuberculosis, a term which should be used to denote tuberculosis of the tracheobronchial lymph nodes. While it has been classified variously, the simplest and probably the most practical classifications are those of Samson<sup>2</sup> and of Myerson.<sup>3</sup> These include the nonulcerative, nonstenotic or infiltrative lesions, the hyperplastic, granulomatous or tuberculomatous and ulcerative lesions often considered as ulcerogranulomatous, and represent different stages of the same process. The fibrostenotic group represents the results of healing. Two or more of these may be observed in the same patient.

Regarding the pathogenesis of these tuberculous lesions, considerable evidence has been produced to support the belief that they may occur by direct contact or implantation, by continuity, by contiguity, or by hematogenous infection. Myerson is of the opinion that the tuberculous infection progresses from the parenchyma of the lung by way of the smaller bronchi until it reaches a main bronchus. Auerbach<sup>3</sup> found involvement of the bronchi close to the cavities in over 90 per cent of the cases in which he performed autopsies. While a large number of the lesions found in the larger bronchi are seen to extend from the orifice of a bronchial subdivision, there are cases in which isolated lesions are observed in the trachea or in a main bronchus and in which no connection can be demon-

strated with bronchial orifices. Obviously no one mode of infection can explain all of these cases. I believe, however, it can be accepted that tuberculous tracheobronchitis rarely is a primary disease, although there are observed instances in which it is impossible to demonstrate a parenchymal lesion. In such a case observed by me there was found an ulcero-granulomatous lesion in the left main bronchus with extension to both lobar bronchi. Repeated examinations of the chest both by physical examination and x-ray study failed to reveal any evidence of parenchymal disease and the patient ultimately made a complete recovery.

The occurrence of tuberculous tracheobronchitis does not serve as an index to the extent of pulmonary involvement. It may occur as a complication in cases of minimal as well as advanced disease. The findings at autopsy cannot be compared with the findings at bronchoscopy for all patients dying of pulmonary tuberculosis usually have advanced disease whereas patients examined bronchoscopically presumably still are in fairly good condition. There are a few statistical reports based on consecutive admissions which were studied bronchoscopically. Probably the best report on the general incidence is that of McIndoe and his associates<sup>4</sup> who did bronchoscopic studies on 272 patients as routine admissions. In this series they found 11 per cent of demonstrable tuberculous tracheobronchitis. Other series have been reported with usually a much higher incidence of tracheobronchial involvement, but these were not consecutive admissions. In the series of cases examined by me totaling 177 patients there were found 48 instances of demonstrable tuberculous lesions, a percentage of 27. In addition there were five patients in whom one could not be certain whether the bronchial lesions were tuberculous or of pyogenic origin. It is possible, therefore, that the rate was higher than 27 per cent. The reason for the high incidence in this group is that these patients were referred for bronchoscopy because there were evidences by physical signs, roentgen study or subjective symptoms which

<sup>\*</sup>Read at meeting of New York State Chapter of American College of Chest Physicians held at New York City on January 23, 1942.

pointed to the probability of tuberculous tracheobronchitis

It is of interest to note that this complication is more common in women than in men. In my group there were 33 females and 15 males. Various explanations have been offered. Also, it is more common in the left bronchus.

In general, the findings that would suggest the presence of tuberculous tracheobronchitis may be divided into subjective symptoms, certain physical signs, roentgen ray evidences and variations in sputum. The most common indication in my series was unexplained roentgen ray findings. The presence of positive sputum in an apparently controlled pulmonary lesion and variations in the quantity of sputum, also variations in the finding of tubercle bacilli often are explained by a tracheobronchial lesion. Wheezing respiration and irritative cough should always suggest the possibility of a tuberculous lesion.

It is often difficult to classify cases on the basis of the bronchoscopic findings, due to the co-existence of two or more lesions. In 7 patients the lesion was definitely submucosal and did not exhibit ulceration. It was observed that irritative cough is a common symptom in patients with submucosal infiltration. Granulomatous and ulcerative types frequently coexist as also do the ulcerative and the cicatricial. Ulcerogranulomatous cases numbered 23. There were 7 cases of ulcerogranulomatous lesions with cicatricial stenosis and 11 cases of cicatricial stenosis.

Discrete pedunculated granuloma may produce bronchial obstruction with retention of secretions and drowned lung. One such case was observed. The patient, aged 28 years, had pulmonary tuberculosis for two years. Beginning several months prior to bronchoscopic examination there were periods of fever with chills, cough, a peculiar strangling sensation followed by discharge of a large quantity of pus. The cough at times exhibited a curious whistling sound. Following an episode of cough and evacuation of pus the temperature would return to normal. At bronchoscopy, there was found a large pedunculated granulomatous mass occluding the right bronchus beyond the orifice of the upper lobe bronchus. This was removed bronchoscopically with striking changes in the

patient's general condition, physical signs and roentgen findings. Iodized oil was later instilled into the right bronchus and a saccular bronchiectasis was demonstrated. This patient ultimately was treated by thoracoplasty with a very satisfactory result.

Wheezing respiration and cough are commonly observed in partial bronchial obstruction. The following case is illustrative. Male, age 32 years, developed wheezing and persistent cough following a cold. Repeated studies of the chest and sputum were negative for tuberculosis. At bronchoscopy there was found an extensive granulomatous lesion involving the left main bronchus and extending to the orifices of both upper and lower lobe bronchi. Secretions and tissue removed were positive for tuberculosis. The patient was again studied roentgenologically, making films at the end of inspiration and expiration and marked obstructive emphysema was found. He was placed on an anti-tuberculous regimen and ultimately made a satisfactory recovery. At no time could there be demonstrated any evidences of parenchymal tuberculosis. This case demonstrated the possibility of a primary focus in the larger bronchi. The case also demonstrates that spontaneous recovery is possible without any form of endobronchial treatment.

Although commonly observed in the adult form of tuberculosis, granulomatous lesions may be observed in the young. While these commonly represent the intrusion of a tuberculous lymph node into the bronchus there are occasionally observed cases in which this has not occurred. The following case is illustrative. A child, age 10 months, who had been treated for bronchial asthma, was finally examined bronchoscopically to explain a marked obstructive emphysema of the lung. At bronchoscopy there was found a small granuloma in the right bronchus which was removed and proved to be tuberculous.

It is important to bear in mind that the bronchoscopist can see only the proximal end of the lesion in a case of stenosis of a bronchus. He cannot give an opinion concerning the mucosa beyond the point of stenosis. It is probable that ulceration may persist particularly in those cases where tubercle bacilli still are found in the bronchoscopically removed secretions or in the sputum. In addition a number of cases of cicatricial stenosis

ultimately develop bronchiectasis. The amount of retention of secretion depends upon the degree of stenosis. In two cases there was observed complete stenosis or obliteration of a bronchus, in one the orifice of the middle lobe bronchus was obliterated and in the other the right bronchus immediately beyond the upper lobe bronchial orifice was atresic. The lung beyond the point of stenosis was airless and at no time could there be found any communication at the point of stenosis.

In the differential diagnosis it is necessary to consider other forms of ulceration. Carcinoma and tuberculosis may be found to co-exist. In the presence of a positive sputum and a characteristic tuberculous lesion diagnosis usually is not difficult. While the objections to biopsy of a tuberculous lesion may in part be theoretical, it probably is safer not to resort to this procedure unless the appearances of the lesion are more suggestive of new growth than of tuberculosis. In the early days of bronchoscopy when our knowledge of tuberculous tracheobronchitis was meager, biopsy was performed more often. I cannot recall a single instance in which there were any untoward effects. In spite of this, however, I do not believe that it should be performed unless the indications are well defined.

*Treatment*—There appears to be considerable difference of opinion regarding the plan of treatment to be employed endobronchially in tuberculous tracheobronchitis. This is in great part due to the recent acquisition of our knowledge concerning this condition and also that inadequate time has elapsed to permit arriving at final conclusions. There still is difference of opinion regarding the treatment of tuberculous laryngitis. There are those who believe that treatment of infiltrating and ulcerogranulomatous lesions is of no avail since the disease either will progress or recover spontaneously without endobronchial manipulations. Irradiation therapy has been recommended with variable results. Kernan<sup>5</sup> has employed ultraviolet lamp therapy to the nonulcerative, infiltrating lesions and is of the opinion that it exerts a beneficial effect.

Ulcers are commonly treated by some form of cauterization. Silver nitrate seems to be more generally employed and is used in variable strengths from 5 to 25 per cent. There

is difference of opinion regarding the desirability of using strong solutions because of subsequent cicatrization. Electrosurgical cauterization and electrocoagulation have been employed. The results reported, too, are variable. The use of a 5 per cent silver nitrate to ulcers has probably given better results in my cases than any other form of treatment. A number of cases were treated by electrocoagulation and in instances satisfactory results were secured, but in an equally large number these could not be corroborated. I believe it is important to make very superficial applications so that the underlying tissues are not injured. I do not favor extensive cauterization as I believe it increases scarring and it is questionable whether it will materially alter the progression of the lesion.

I still believe that the important consideration in the treatment of tuberculous tracheobronchitis is dependence on systemic measures together with collapse therapy if there is little or no obstruction. Mechanical removal of granuloma is inadvisable unless the lesion is more or less pedunculated and single. This was practiced in one case with a satisfactory result.

Cicatricial stenosis of the bronchus is exceedingly difficult to treat and each case must be considered individually. This is particularly true if the cicatricial process involves the entire circumference of the bronchus. These patients frequently present problems that have to do with retention of pus, fever, chills, etc. As is the case with all forms of cicatricial stenosis of the bronchus, dilatation by bouginage gives but temporary relief. There are times when this is nevertheless desirable in order to improve drainage. I have treated four cases of cicatricial stenosis of marked degree by bouginage. In two the benefits were temporary in that ultimately the patients developed persistent fever with extensive suppuration beyond the point of stenosis and it was necessary to carry out some other plan of therapy. In both of these, pneumonectomy was successfully performed. In a third case, dilatation was carried out for a time but the patient became discouraged and the procedure was discontinued (Fig 1). In a fourth case, still under treatment, there is marked stenosis of the left main bronchus, the lumen of which is not more than 3 or 4 millimeters in diameter. The lumen is ringed

with small granulations and after three or four weeks these become almost completely obstructive with retention of a large quantity of pus beyond the point of stenosis. If the patient is treated every three or four weeks, she continues afebrile and appears to be in very satisfactory condition. It is very probable, however, that ultimately it will be necessary to resort to some other form of procedure, preferably pneumonectomy.

Kernan<sup>5</sup> has employed a copper bougie electrode for ionization and believes that this aids in dilatation of the stenosis. Not all cases of stenosis require treatment. The determining factor is whether or not there is retention of secretions with suppuration distal to the point of narrowing. I have under observation four cases with stenosis of the bronchus in whom there is no retention of secretions and the patients are relatively comfortable. One cannot, of course, determine when there will be an increase in the narrowing of the exist-

ing stenosis with infection beyond (Fig 2). Complete occlusion of the bronchus would be desirable. Two patients with this condition have been observed and they are free from symptoms. At the request of Dr A J Cohen and Dr George Willauer, I attempted to produce stenosis of the bronchus in four patients following thoracoplasty with a view of producing atresia of the bronchus. Acid acriflavine solution was employed. In three instances the results were very satisfactory but in the fourth case there occurred a serious infection beyond the point of stenosis and the patient developed a marked bronchiectasis, expectorated enormous quantities of pus and entered into a state of chronic invalidism. Following this I discontinued the procedure as I do not believe it is entirely free from danger. I believe, therefore, that simple dilatation and bronchoscopic aspiration of secretions beyond the point of stenosis is indicated in those who have suppuration. The employment of salt solution containing epinephrine sulphate may be instilled beyond the point of stenosis to aid in getting rid of secretions and shrinking the mucosa. I have not employed other forms of medication. I



Fig 1 Roentgenogram of chest of a woman aged 36 years, who has pulmonary tuberculosis with cicatricial stenosis of the left main bronchus, collapse of left lung with retraction of trachea to left and evidences of bronchiectasis of lung. Bronchoscopic dilation of the stricture and aspiration of pus gave temporary benefit but the patient did not wish to continue treatment. With irregular fever, sweats, pain in left chest and increasing dyspnea the prognosis is unfavorable.



Fig 2 Roentgenogram of chest made after instillation of iodized oil in left bronchus of a woman, aged 27 years, revealed marked narrowing of left main bronchus (shown by arrow) with bronchiectasis of many subdivisions beyond the point of stenosis. The stenotic lumen is about 3 millimeters in diameter and resists dilation. There is practically no retention of secretion beyond the stricture except following acute respiratory infections. The sputum now is free from tubercle bacilli and she is symptom-free except for episodes of fever and chilliness with purulent sputum and evidences of retention of secretion with each respiratory infection. These respond promptly to bronchoscopy. The ultimate prognosis is unfavorable.

am of the opinion that pneumonectomy or lobectomy as required should be considered in these cases if suppuration is present, as the ultimate prognosis is grave

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## Annual Meeting—Pennsylvania Chapter

The Second Annual Meeting of the Pennsylvania Chapter of the American College of Chest Physicians was held at the William Penn Hotel, Pittsburgh on October 4-5. The annual banquet of the Chapter was held on Sunday night October 4th the evening prior to the opening day of the Ninety-second Annual Session of the Medical Society of the State of Pennsylvania. Dr. J. Winthrop Peabody, Washington, D. C., president of the College, was the guest speaker at the banquet. Dr. Peabody discussed the rapid growth of the College and the added responsibilities of our members under war conditions.

On Monday morning October 5th, an interesting scientific program was presented. "The Treatment of Pulmonary Tuberculosis in the Rejected Draftee" by Dr. C. Howard Marcy, Pittsburgh, brought forth a lively discussion. Dr. Marcy's

presentation was very timely and appropos of present conditions. Dr. Louis Cohen, Philadelphia, presented an interesting talk, illustrated with lantern slides, on "Fluoroscopic Guidance in the Treatment of Thoracic Diseases." The program closed with "Information Please" and many interesting questions were presented and discussed.

The following officers were elected for the ensuing year: Dr. Royal H. McCutcheon, Bethlehem, president; Dr. John S. Packard, Allenwood, vice-president; and Dr. Edward Lebovitz, Pittsburgh, was reelected secretary-treasurer.

The members of the Pennsylvania Chapter of the College extend a vote of thanks to Dr. Russell S. Anderson, Erie, the retiring president. Dr. Anderson has successfully conducted the affairs of the Chapter since its inception.

### PENNSYLVANIA—A PIONEER

(Continued from page 347)

now one of the largest sanatoria in the world. In 1912 the state opened Cresson State Sanatorium for Tuberculosis and two years later the Hamburg State Sanatorium. In 1938 a fourth sanatorium for the tuberculous was erected in the western end of the state at Butler. However, this institution has never been opened for that purpose despite waiting lists and a high residual tuberculous population throughout the state.

For many years a system of State Tuberculosis Clinics has thrived throughout the state and in 1939 state-controlled pneumothorax centers were established at strategic points. This work of inestimable value is under the able direction of Major General C. R. Reynolds, former Surgeon General of the United States Army.

Today Pennsylvania has many county and local organizations actively engaged in the coordinated fight against tuberculosis. There are now some eighteen institutions devoting their more than

6000 adult beds to the treatment of tuberculosis. Some of the best known of these, besides the sanatoria mentioned above, are the Tuberculosis League Hospital of Pittsburgh, the Eagleville Sanatorium of Eagleville, Pa., and Devitts Camp at Allenwood, Pa., established by our former president, Dr. William Devitt. There are also included some excellent county institutions.

Regardless of her long experience in developing organizations and institutions to combat tuberculosis, the set-up here as elsewhere is not perfect. There is yet much that can be done to refine and coordinate our several efforts. Into the picture has come as recently as 1941 the Pennsylvania Chapter of the American College of Chest Physicians. It is the writer's modest hope that this newly created group will help prove the faith of its predecessors in bringing about better and brighter days to the Commonwealth.

## MIDDLE ATLANTIC STATES ISSUE

## NEW JERSEY SECTION

Joseph R Morrow MD Ridgewood New Jersey *Chairman*

## The Tuberculosis Movement in New Jersey

ERNEST D EASTON\*

When the New Jersey Tuberculosis League came into existence in 1906 there were already four local committees functioning in a small way. By 1907, however, there were twenty-one local committees and there is now an affiliated organization in every county. From the inception of the movement the volunteer associations have concentrated their efforts on educational programs. Other services, when undertaken, have been in the nature of demonstrations with the frank intention of securing official funds for their maintenance as soon as the experimental stage of the project was passed and its effectiveness shown. The consequence is that the clinic, nursing, sanatorium, and health education services now available throughout New Jersey are largely supported by state, county, and municipal appropriations.

As a result of the tuberculosis program in the state, facilities have been extended each year until they now directly serve nearly a half million. In the number in 1940 were included

42,782 different persons attending clinics

52,536 persons examined through adult mass surveys

6,783 persons treated in sanatoria

250,000 students, teachers and employees examined in schools

46,000 draftees x-rayed in induction centers

### Cooperating Agencies

Clinics and nursing services are operated under joint auspices of sanatoria, health departments, tuberculosis associations, general hospitals, county freeholders, Red Cross chapters and industrial plants. Sanatoria, general hospitals and Boards of Health serve as centers for 96 clinic services.

### Mass Surveys

More than a quarter of a million students and teachers were included in the extensive tuberculin testing and x-raying examination now required by law of New Jersey's high school students, teachers and employees. The exigencies of such an immense program accelerated establishment of examinations for industrial workers, National Youth trainees and selective service men, while increased emphasis was placed on relief, WPA, Negro and other low income groups as case sources.

During 1940 the clinics extended their extra-curricular activities to include 10,829 adult persons examined in mass surveys. Mobile units furnished by county sanatoria or commercial firms were chiefly employed in the surveys, although in some instances examinations were made at sanatoria or other well-equipped central points. A significant development was the mobilization of the state's facilities for examination of selective service enrollees. This was made possible through cooperation of the Tuberculosis Committee of the State Medical Society, draft boards and the U S Army. With the cooperation of clinicians and sanatoria, four induction stations were equipped with portable units staffed by clinicians, technicians, and nurses. Consultation facilities and x-ray examinations were also made available to local draft boards in a number of counties. The chest x-ray is now a routine part of Army and Navy examinations.

### The Problem of the Negro

Negroes are a little more than five per cent of the state's population, but contribute more than one fourth of the tuberculosis deaths. The Negro death rate was reduced by 28 per cent during the last decade. Negro Advisory Committees have been formed in a number of the counties. There have been numerous Negro Health Week observances followed by efforts to maintain all year round Negro health education programs. Negro physicians and nurses have been added to clinic personnel. Special institutes and training courses were organized for physicians. There have been a number of mass surveys of Negro groups undertaken, and the health message has been carried by meetings and motion pictures from the church and lodge hall to the pool room and neighborhood barber shop. A full-time Negro consultant, Dr J Earle Stuart, is now on the staff of the State Health Department and Dr W G Alexander, the League's Negro Advisory Committee Chairman, has been appointed a member of the State Board of Health.

### Sanatorium Facilities

The State of New Jersey, eleven of its counties and one municipality maintain sanatoria for the care of their tuberculosis patients. The other ten counties send their patients to the State Sanatorium at Glen Gardner and to private and other public institutions authorized to accept patients at state and county expense. These institutions provide 3644 beds for tuberculous adults and children.

### Post Sanatorium Care and Adjustment

The recent passage of the Artaserse Bill and the cooperative agreement made between the New Jersey State Rehabilitation Commission and the New Jersey Tuberculosis League constitute practical progress toward development of the all-inclusive, coordinated program of post sanatorium care and adjustment which the League is endeavoring to create.

Outbreak of hostilities at Pearl Harbor found the Tuberculosis League firmly established with offices in every county closely linked to the clearing center in Newark. Close relationship with state departments and cooperating agencies make possible utilization of this machinery for war time emergencies. More than forty organizations cooperated in planning for a meeting in Newark on April 10 for discussion of "Health in War Times and After."

Success of the program for tuberculosis control employed during the depression years gives encouragement to hope that the threat of increased disease presented by our entry into the second World War will be overcome by prompt and efficient employment of the measures available.

\*Executive Secretary New Jersey Tuberculosis League

## *Tuberculosis Pioneers in New Jersey*



**BERTHOLD STEINBACH POLLOCK, M.D**

**JERSEY CITY NEW JERSEY**

Medical Director, Hudson County Tuberculosis Hospital



**SAMUEL B. ENGLISH, M.D**

**GLEN GARDNER NEW JERSEY**

Medical Director, New Jersey Sanatorium for Tuberculous Diseases

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## *Officers of the College*



**JOSEPH R. MORROW M.D**

**RIDGEWOOD NEW JERSEY**

Chairman New Jersey Section Middle Atlantic States  
Issue President New Jersey Chapter



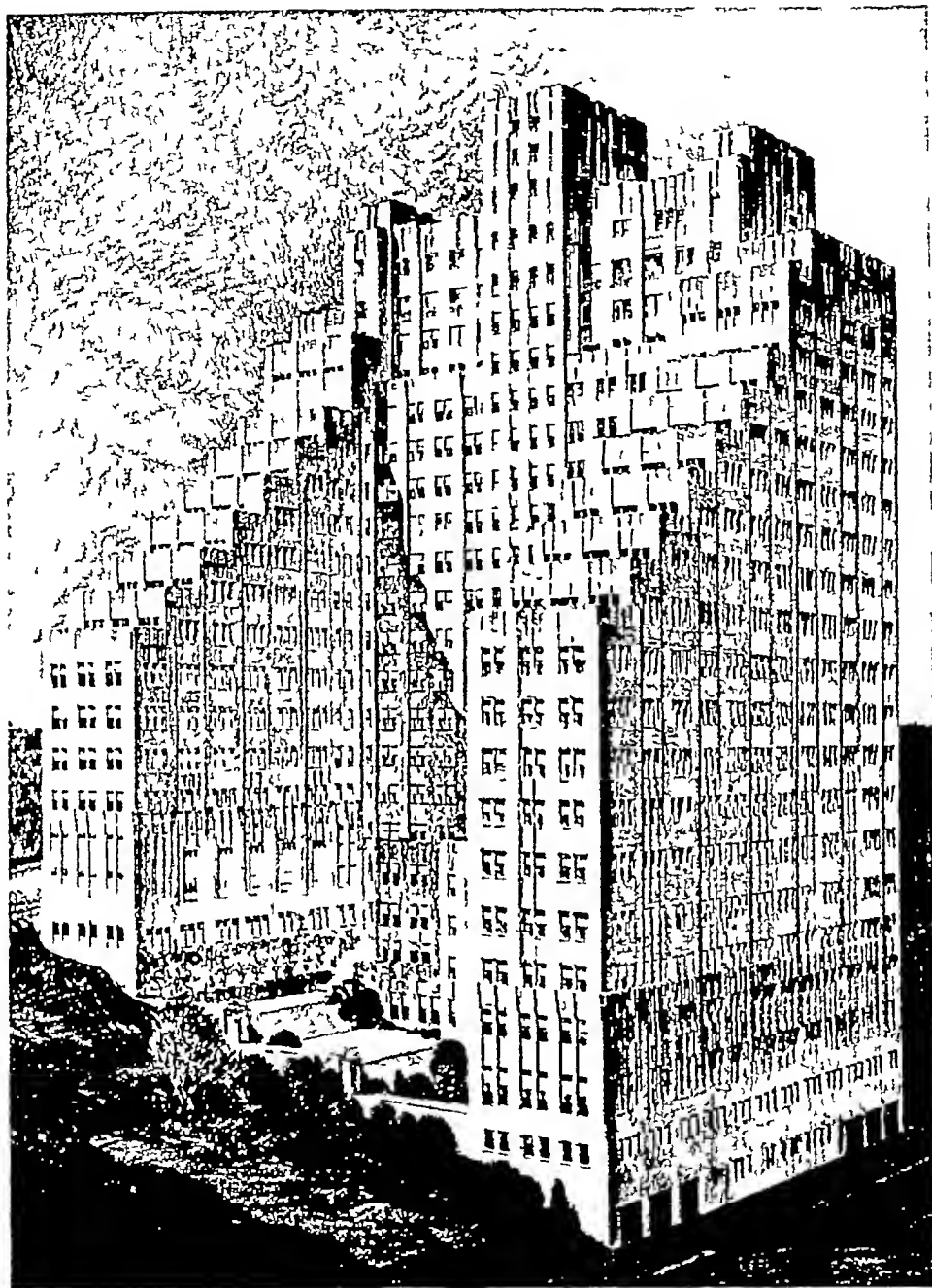
**MARCUS W. NEWCOMB, M.D**

**BROWNS MILLS NEW JERSEY**

Governor American College of Chest Physicians New Jersey



# New Jersey Sanatoria



## HUDSON COUNTY TUBERCULOSIS HOSPITAL

JERSEY CITY NEW JERSEY

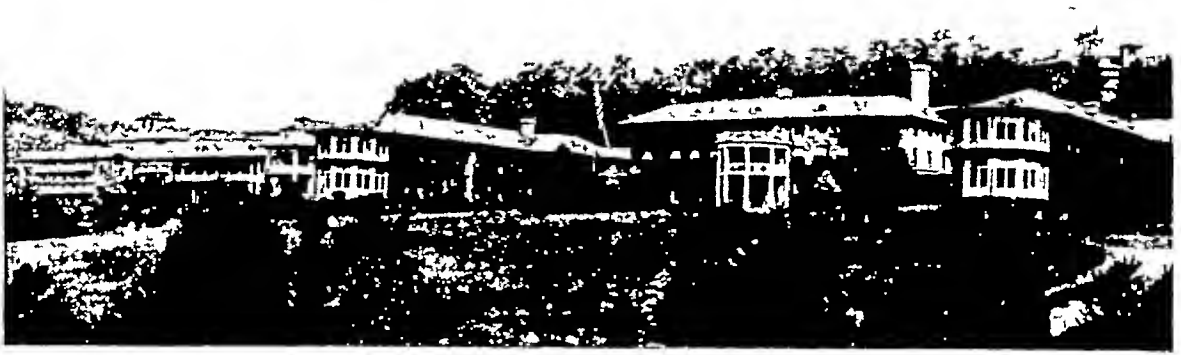
The hospital accommodates all types of tuberculosis. Bed capacity is 510 which can be increased, if necessary, to 675.

This hospital houses the central clinic of the Hudson County Tuberculosis Clinic.

The various departments are in charge of physicians who are specialists in their representative branches.

The surgical division contains fifty beds and occupies the 14th and 15th floors of the institution. Dr. B. S. Pollak is the medical Director.

# New Jersey Sanatoria



## NEW JERSEY STATE SANATORIUM

GLEN GARDNER, NEW JERSEY

This sanatorium was opened in 1907. The patient capacity has grown from 105 to about 500.

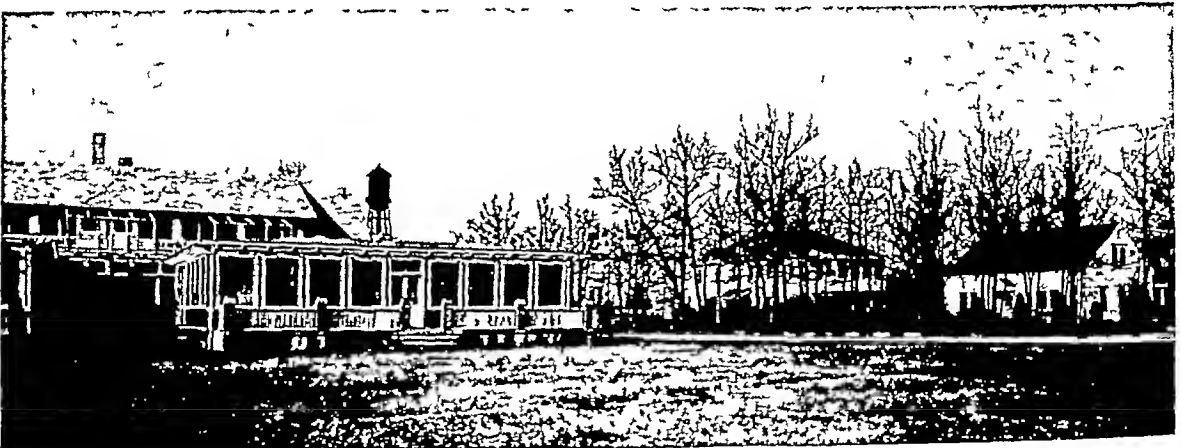
The institution has its own farm and dairy and is also provided with its own water and sewage plants.

The surgical department was added in 1938 and approximately 80 per cent of the patients are receiving some type of collapse therapy.

The out-patient department is giving assistance to the rural sections where tuberculosis activities under local

supervision is not well cared for. At the present time there are two traveling clinicians who hold about fifty clinics monthly and see from 12,000 to 15,000 patients annually. These clinicians offer consultation for the local practitioner, easy means of admission to the institution for the patient and care and advice for the ex-patient.

Dr. Samuel B. English has been Medical Director of the sanatorium since 1907.



## ALLENWOOD SANATORIUM

ALLENWOOD, NEW JERSEY

Allenwood Sanatorium, the Monmouth County Tuberculosis Hospital, was established in 1921 and is situated near Farmingdale, New Jersey. It has grown steadily to meet increased needs and now has eight buildings and 100 beds.

During 1941, care was provided 222 bed patients. A

summary of the clinic work shows that in this year 1563 x-rays were taken, 640 pneumothorax cases treated with 2517 treatments given and 2688 fluoroscopic examinations performed.

Miss Elizabeth Hynes, R.N., is Superintendent, and Dr. Frank J. Altschul, Medical Director.

# New Jersey Sanatoria



## DEBORAH SANATORIUM

BROWNS MILLS, NEW JERSEY

Deborah Sanatorium is a five-story steel and concrete constructed fireproof building capable of housing 77 patients

The ground floor consists of offices laboratory, x-ray room dining room for patients dining room for staff and a kitchen the second floor of male wards with the ca-

capacity of thirty-two beds the third floor of female wards with the capacity of forty-five beds

An addition on the fourth floor will accommodate forty-five more patients The fifth floor is to have an operating room and solarium Dr H Barenblatt is the Medical Superintendent



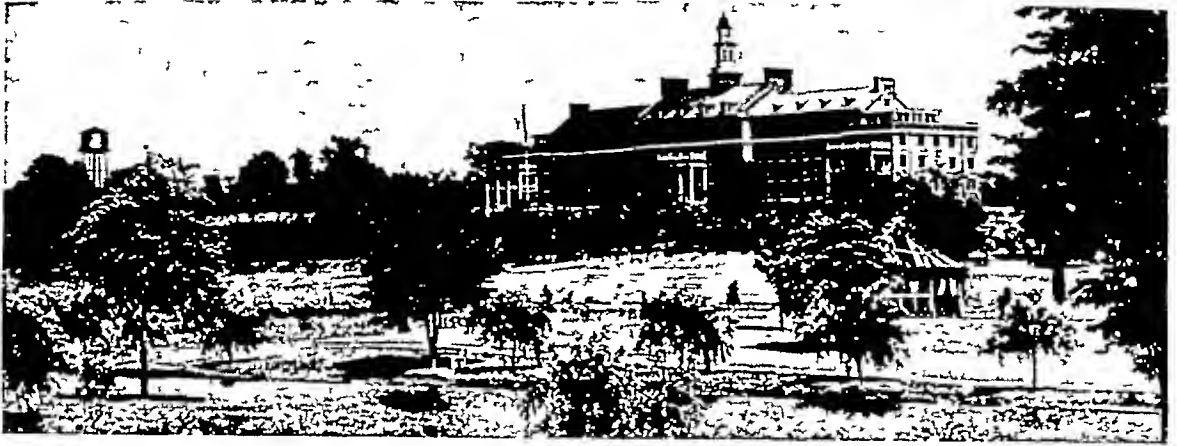
## LAKELAND SANATORIUM

GRENLOCH, NEW JERSEY

Lakeland Sanatorium was opened in 1925 for all stages of tuberculosis pneumoconiosis Children admitted in separate building Negroes are also admitted The capacity of the sanatorium is 232 Diagnostic and treat-

ment facilities available are x-ray pneumothorax bronchoscopy thoracoplasty and all surgical procedures Out-patient service is available for follow-up and pneumothorax refills Dr Martin H Collier is the Superintendent

# New Jersey Sanatoria



## ROOSEVELT HOSPITAL

METUCHEN NEW JERSEY

The Roosevelt Hospital Middlesex County Sanatorium, was opened on March 8 1937 and since then has hospitalized a total of 1597 patients In addition to caring for resident patients it maintains an out-patient department for x-raying and examining out-patients referred by private physicians

All types of collapse therapy are given at the institu-

tion The necessary surgery is performed by a visiting surgical staff

The institution is headed by its superintendent and medical director and board of managers who are responsible to the Middlesex County Board of Chosen Freeholders Dr Joseph A Smith is Acting Superintendent and Medical Director



## SHONGHUM MOUNTAIN SANATORIUM

MORRISTOWN, NEW JERSEY

Shonghum Mountain Sanatorium was established in 1914 and was completely remodeled. A new hospital building was added in 1940 Its present capacity is 76 beds. All types and stages of tuberculosis are admitted

Only residents of Morris County are eligible for admittance Dr Harold S Hatch is Superintendent and Medical Director

# New Jersey Sanatoria



## FAIRVIEW SANATORIUM

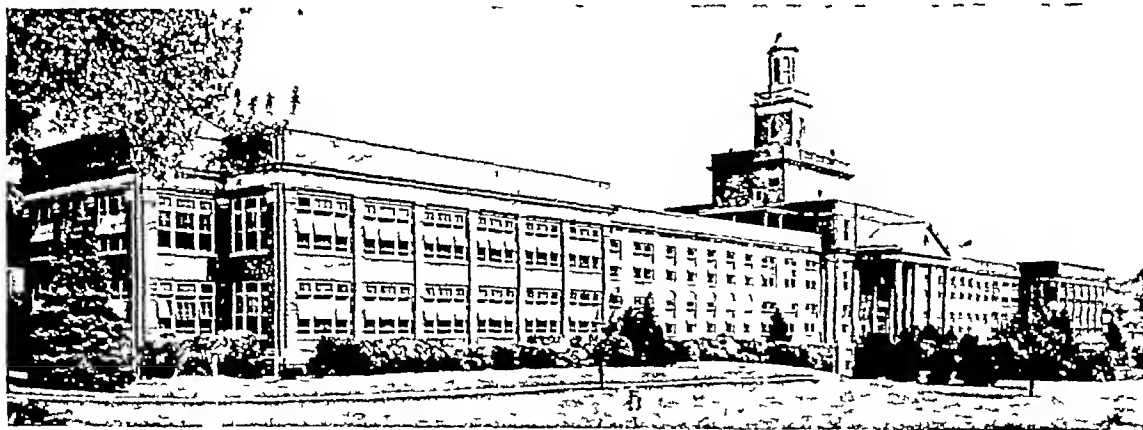
NEW LISBON, NEW JERSEY

Fairview Sanatorium, the Burlington County Sanatorium for Tuberculosis, was opened in September 1917 with a capacity of 25 beds and now has a capacity of 114 beds. It admits all stages of tuberculosis both pulmonary and surgical.

The sanatorium has a fully equipped laboratory and

an x-ray department. Pneumothorax, phrenic and pneumonolysis operations are done in the sanatorium. Thoracoplasty operations are done in a general hospital.

Dr. Marcus W. Newcomb has been Superintendent and Medical Director for 23 years.



## VALLEY VIEW SANATORIUM

PATERSON, NEW JERSEY

Valley View Sanatorium is a 230-bed institution carefully planned and equipped for the care and treatment of all types of cases of tuberculosis and is located in the Breakneck Hills overlooking the Passaic Valley.

Since the opening of the institution in 1929, approxi-

mately 3,000 patients have been admitted for treatment.

The sanatorium employs a county tuberculosis clinician who carries on a diagnostic clinic service, county-wide, through the various health departments located in the cities of the county.

# New Jersey Sanatoria



## BERGEN PINES

(BERGEN COUNTY HOSPITAL)

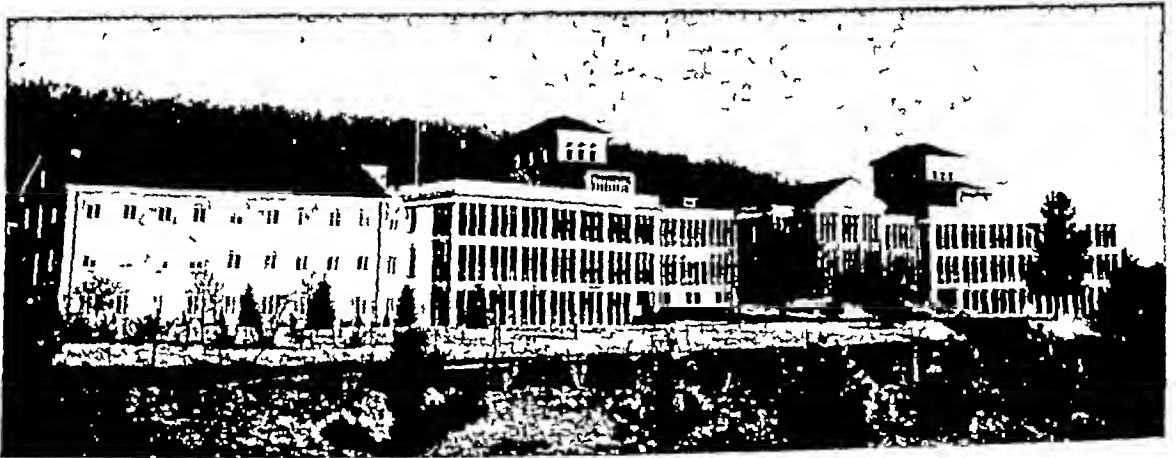
RIDGEWOOD, NEW JERSEY

"Bergen Pines" Bergen County Hospital, was opened in August, 1916, for the admission of poliomyelitis cases during the worst epidemic in history. Shortly thereafter a tuberculosis department was established which now comprises the greater amount of the patient census population in this 500-bed sanatorium.

Set out in park-like surroundings the institution now comprises six modern hospital units equipped in the most scientific manner, with additional service buildings. Here residents of the county suffering from tuberculosis or other communicable diseases are admitted. It has a progressive

department of thoracic surgery and a modern laboratory. There is also an actively functioning out-patient department with diagnostic clinic. X-ray facilities are located in strategic points in the county. The central clinic is in the sanatorium.

"Bergen Pines" has a preventorium which has functioned successfully for a number of years and a therapeutic pool donated by the Bergen County American Legion and American Legion Auxiliary which is operated as an out-patient unit. Dr. Joseph R. Morrow is the Medical Director and Superintendent.



HOSPITAL BUILDING

## BONNIE BURN SANATORIUM

SCOTCH PLAINS NEW JERSEY

Bonnie Burn Sanatorium was opened in November 1912, with 64 patients. It now has a capacity of 400. Children are admitted in a separate building. Accepts all stages of tuberculosis in any form, bronchiectasis, asthma, and

other forms of pulmonary disease. Limited to residents of the county. The Superintendent and Medical Director is Dr. John E. Runnells.

# New Jersey Sanatoria



ADMINISTRATION BUILDING

## ESSEX MOUNTAIN SANATORIUM

VERONA, NEW JERSEY

The Sanatorium was founded in 1908 as Newark City Hospital and acquired by the county in 1917 and operated since then as the Essex County Sanatorium

The physical plant consists of twenty-one buildings with a capacity for 445 patients

It has its own power supply water supply and sewage disposal system

Patients in all stages and all forms of tuberculosis are accepted

Equipment consists of a complete surgical department

covered by the resident surgeon, performing all kinds and stages of thoracoplasties bronchoscopies pneumolyses and other modern chest surgery procedures

The x-ray department has a laminograph photoroentgen unit and a portable x-ray machine in addition to three fluoroscopes An out-patient clinic serves all out-patients for follow-up and pneumothorax refills

Dr B M Harman is the Superintendent and Medical Director



## ATLANTIC COUNTY HOSPITAL FOR TUBERCULOUS DISEASES

PLEASANTVILLE NEW JERSEY

The new Atlantic County Hospital for Tuberculous Diseases located at Northfield New Jersey, is a fireproof building of modern design and appointments which was opened for the admission of patients on September 15 1941

This institution replaces the former sanatorium which was erected in 1916 It is maintained by the County and only those who have a legal residence in the county

are admitted as patients

The institution is arranged for the accommodation of one hundred patients and has a fully equipped operating room clinical laboratory x-ray and the other facilities necessary for the care and treatment of all forms of tuberculosis Mr Leon Conover is the Superintendent and Dr Clyde M Fish is the Medical Director



# The New Jersey Plan for Tuberculin Testing and X-Raying High School Students as Carried Out in Bergen County\*

JOSEPH R. MORROW, M.D.

Ridgewood New Jersey

## Legislation

In 1940 there went into effect the following law in the State of New Jersey

"Effective July 4, 1940, Boards of Education must periodically determine the presence or absence of active or communicable tuberculosis. The frequency of the examination, the procedure to be followed, and the selection of pupils are prescribed by the rules of the State Board of Education. Any pupil found to have communicable tuberculosis must be excluded until proof of recovery is established."

Chapter 294 of the School Health Bill providing that all High School pupils be tested for tuberculous infection and that all positive reactors be x-rayed prior to June 30, 1941, was then passed. For this purpose, the term "High School" was interpreted as grades 9-12 inclusive. From past experience, it was expected that approximately 30 per cent of the High School pupils would react positively.

## Voluntary Surveys

Before the passage of this legislation, school surveys were conducted in Bergen County upon the request of health officials, Boards of Education and the school physicians. People became educated to the fact that the use of the chest x-ray is essential for the early discovery of tuberculosis since people apparently well may have early disease. Much effort was expended to impress upon the public the fact that tuberculin tests show whether or not a person has been infected with tubercle bacilli, "the x-ray demonstrates whether or not that infection has any significance."

We concentrated on High School students because of the high morbidity and mortality rate between the ages of 15 and 25, and since

\*Much of the material must, of necessity be in detail since it was on the basis of such surveys and the thoroughness and effectiveness of preliminary arrangements that our State Law was passed

we knew that more cases of tuberculous infection would probably be found in this age group than in the lower grades. These were voluntary surveys in which the Bergen County Medical Society, the Bergen County Tuberculosis and Health Association, and the Bergen County Hospital cooperated with the various Boards of Education, school doctors and nurses. Emphasis was placed upon close cooperation with family physicians.

## Preliminary Work

An intensive educational program was first carried out, the school physician and the supervising principal assuming responsibility for the survey. The medical staff of the Bergen County Hospital did the actual clinic work—giving the tuberculin tests, reading the reactions, x-raying reactors, and reporting the findings to the family physicians. The County Tuberculosis Association assumed financial responsibility and underwrote the cost of material used—literature, tuberculin (P. P. D.), paper capes for the girls, x-rays. This money was provided from Christmas Seal Sale funds in the county. Students requiring x-rays were requested to contribute 50 cents toward the cost of the film, if they could do so.

After a date for the survey had been decided upon, the room facilities and policy for reporting the findings to the family and school physicians were discussed. The physicians serving the community to be surveyed were then invited by letter to attend a meeting where the matter was presented to them. The importance of a follow-up on those with positive reactions who did not have an x-ray taken was stressed. At such meetings a sound motion picture on tuberculosis was shown by the Tuberculosis Association.

Teachers and school employees were then called together by the principal of the High School so that their interest and cooperation might be secured. The purpose of the survey was explained to them and they were also shown films and provided with literature on

tuberculosis Students were reached in the same way, followed by an assembly program where an interesting and educational film on the subject was shown *Intensive preliminaries are important*

Before sending *request slips* (not consent slips) to the parents or guardians of the children for signature, a meeting was called to which parents were invited where the entire subject was gone into and they were urged to ask questions It was made very clear that we were going to do something *for them* and not *to them* Request slips were then given each student to secure the signature of parents or guardian

Each school survey received wide newspaper publicity, copy being prepared by the County Tuberculosis Association and issued through the office of the supervising principal where the survey was to be made Scientific facts were checked at the County Hospital

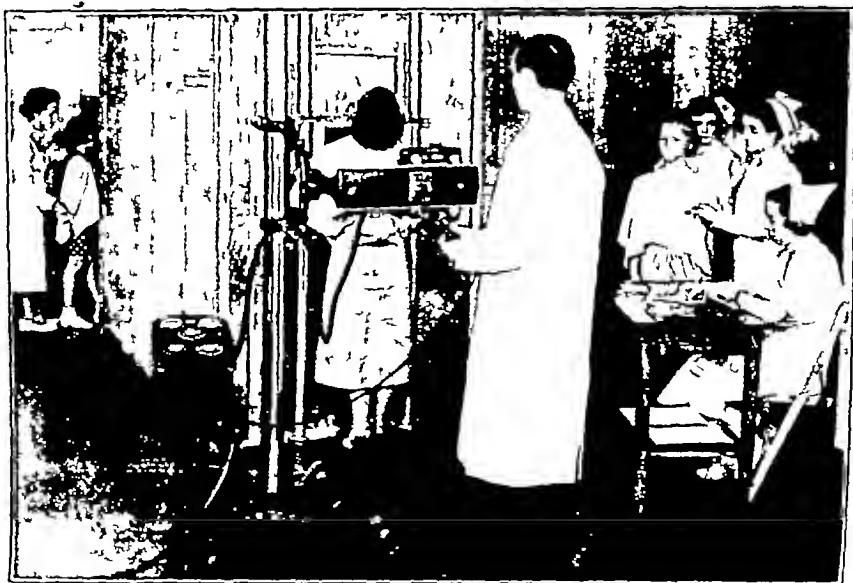
### *The Survey*

The whole procedure was carried out rapidly and in an orderly manner On the date set for the survey some of the medical staff, nurses, and clerks from the hospital would visit the school and set up the equipment for the tuberculin testing In the early days of these voluntary surveys, P P D was used The County Tuberculosis Association would have nurses there to assist and the school nurse, physician, and principal also would be present

A steady line of students bearing their request cards would file past the physicians for the tuberculin tests These were read 48 hours after they were given and those showing a positive reaction would form a line and be x-rayed immediately after the test was read A portable x-ray machine, transported and set up at the school by the sanatorium staff, was used The film was the standard 14x17 A portable darkroom was devised at the hospital and transported to the school, thus permitting immediate developing of every tenth film as a check on the technique

With this method, two physicians, assisted by three nurses and two clerks, were able to test 600 students an hour and x-ray reactors at the rate of 90 to 100 per hour, provided the students came in uninterruptedly The films were then taken to the County Sanatorium, developed there and interpreted by the medical staff To these "readings" were invited the school physician where the survey was made, and the doctors in the community A complete report of the examination of each student was prepared by the personnel of the County Hospital and sent to the school physician and family physician Such reports contained the results of tuberculin testing, x-ray findings, diagnosis, and recommendations

It must be remembered that this work, carried on over a period of five years, was entirely *voluntary*



*X-raying of positive reactors*

## HIGH SCHOOLS SURVEYED IN BERGEN COUNTY

Year	No Tested	Percentage Positive	X-Rays	Active Tuberculosis
1935-1936	531	51.4	273	2
1936-1937	3,297	42.1	1,389	9
1937-1938	2,485	38.99	969	3
1938-1939	6,347	29.76	1,889	1
1939-1940	1,853	26.9	500	4

One can readily see from the foregoing that the amount of time and energy expended were tremendous. However, it was well worth the effort, for, as someone has remarked "Bergen County's effectiveness and efficiency to a large extent set the pace for the state, and the state for the nation." It was really a noteworthy achievement.

These surveys came to be almost a matter of routine, not only the physicians of the county, but the students and their parents came to regard tuberculin testing and x-raying as well worthwhile. Fine cooperation from the doctors was had all the way through. Some of the doctors in the medical society who strenuously insisted that it would interfere with their private practices found in reality that it put patients in their offices. They changed their opinion and many remarked that families whom they had not seen since the birth of the youngsters now came to their offices.

*Schedule Since Passage of the Law*

Upon the passage of the State Law certain regulations were formulated. Although the Bergen County Hospital and the County Tuberculosis Association are still participating organizations, their work is very much less.

The following schedule was worked out:

1) Bergen County Hospital agrees to be responsible for the technical service and will supply technicians, nurses, and equipment for the surveys.

2) The County Tuberculosis Association will assist with organization and with educational programs preceding the survey, supplying necessary literature and teaching aids and the tuberculin for the skin tests.

3) The County Tuberculosis Association agrees to underwrite the cost of the x-ray plates and bill local Boards of Education at the rate of 50 cents, the actual cost of the film, for each x-ray made.

The superintendent of schools of Bergen

County sent a notice to all secretaries and Boards of Education to the following effect:

"If you choose to employ these aforementioned agencies, arrangements for tuberculin testing must be made in writing to the Executive Secretary of the Bergen County Tuberculosis and Health Association. *The Board of Education may choose to have this testing done in any way it chooses in compliance with the law. The above plan is offered in good faith and was formulated to assist in expediency in a new departure.*"

However, no commercial agency has been called in. The surveys are still conducted by these interested and cooperating agencies where the health angle is stressed. The survey is carried on for this purpose, not for any pecuniary gain, since none accrues. As a matter of fact, these participating agencies do this at a loss so far as time and money are concerned, but it is counted *gain* considering the results, which are far-reaching. School films also very often prove to be a great help in future years in cases of tuberculosis and its eradication. All the Boards of Education in the County cooperated since the voluntary surveys which the County Hospital and Tuberculosis Association had conducted, were known to all.

In conducting the testing and surveying, after the passing of the State Statute in 1940 a change was made in tuberculin from P P D to the Patch Test. This was found to give practically the same results as the previous method and the students, parents, and school personnel seem to like it better. Many persons dislike the idea of an injection. Furthermore, the school doctors can apply these patches with assistance from the medical staff of the County Hospital in reading the results.

The law is interpreted to mean that once in the High School life of a youngster (grades 9-12 inclusive) he should have a tuberculin test, with an x-ray if a positive reactor. Employees are to be tested once in three years, an employee being any person who is in the employ of the Board of Education.

Since this State Law has gone into effect, we have obtained the following results from the High School surveys:

Year	No Tested	Percentage Positive	X-Rays	Active Tuberculosis
1940-1941	18,428	14.03	3,341	17
1941-1942	19,018	15.91	3,294	10

The educational value of this work cannot be overestimated. It paves the way for establishing a routine program, now strongly advocated, of x-raying all admissions to general hospitals. It is not necessary to dwell on the known fact that student nurses and hospital employees are being given particular attention along this line.

Because our work in conducting surveys is so well known throughout the county, we have been asked to conduct them among other groups, notably prisoners, industrial plants, National Youth Administration workers, etc. Such clinics often combine the taking of blood for a Wassermann test at the same time, the specimens being examined at the county laboratory which is also located at the hospital. There are many persons reached through these clinics or surveys whom we would otherwise not contact.

We need to keep in mind the fact that future legislation may widen the scope of work, particularly among food handlers and expectant mothers. Many of the individual physicians in Bergen County are already doing fine work among the latter group by having prenatal cases tuberculin tested, and x-raying the positive reactors. The 4x5 film will doubtless facilitate all these programs.

We in Bergen County feel that we can take just credit for our five years of voluntary work conducting surveys in secondary schools. Such surveys have proved their value conclusively. We in New Jersey are proud of the fact that our state is the first one to pass legislation making tuberculin testing, with x-raying of positive reactors, mandatory in our High Schools, an important step toward the ultimate elimination of tuberculosis.

## New Jersey Chapter Meets

The New Jersey Chapter of the American College of Chest Physicians held its Fall Meeting at Bergen Pines, Ridgewood, New Jersey, on Friday, September 25th. Dr. Joseph R. Morrow, President of the Chapter, presided.

Dr. George M. Levitas of Westwood, member of the Board of Managers of Bergen Pines, made the welcoming address. He discussed the views of the general practitioner on tuberculosis in contrast to the specialist.

Dr. J. Winthrop Peabody of Washington, D. C., President of the American College of Chest Physicians, spoke on the "Aims of the American College of Chest Physicians." He discussed the following essential factors: (1) the organization of the College eight years ago, (2) the adoption of the new by-laws at the annual meeting in Atlantic City this year, (3) the plans for organizing a Board of Specialists for diseases of the chest and for research in pulmonary diseases, (4) rigid requirements for admission to the College, (5) an exclusive membership, both national and international, (6) the organization of chapters, both national and international, (7) closer relations and cooperative meetings between the various chapters, (8) instruction in chest diseases for the general practitioner, (9) joint sessions with specialists in diseases closely related to diseases of the chest, (10) the work of the Council on Undergraduate Medical Education, (11) the progress and expansion of the official journal "Diseases of the Chest," and (12) future plans for the College.

Dr. Samuel Alexander, Freeholder of Bergen County, declared that public opinion was a big factor in the eradication of tuberculosis because it brought about the erection of such fine county institutions as Bergen Pines.

Dr. B. S. Pollak, Medical Director of the Hudson County Tuberculosis Hospital, pointed with pride to the fact that the medical men, many of them members of the New Jersey Chapter of the College, had been instrumental in impressing the

Legislature of the need for passing the law which made tuberculin testing compulsory for High School students, and school personnel in New Jersey.

Dr. Samuel B. English, Medical Director, Glen Gardner, New Jersey State Sanatorium, also spoke, as well as many of the others who were present.

An x-ray symposium was held following the meeting. Interesting and unusual x-rays were presented and discussed.

Others present were Dr. Clyde Fish, Medical Director, Atlantic County Tuberculosis Hospital and Vice-President of the New Jersey Chapter, Dr. Irving Willner, Secretary of the New Jersey Chapter, Dr. Harold S. Hatch, Superintendent, Morris County Tuberculosis Hospital, Dr. Stephen A. Douglass, Superintendent, Passaic County Sanatorium, Dr. D. L. Melvin, Greystone Park, Drs. David Biber and H. H. Cherry, Valley View Sanatorium, Dr. B. S. Pollak, Medical Director, and Dr. B. J. Elwood, Hudson County Tuberculosis Hospital. Dr. Samuel B. English, Superintendent, and Dr. Elliot I. Dorn, New Jersey Sanatorium for Tuberculous Diseases, Dr. Byron M. Harman, Superintendent and Medical Director, and Dr. W. F. Bennett, Essex County Sanatorium, Dr. John E. Runnells, Superintendent, Union County Sanatorium, Dr. H. Barenblatt, Medical Director, Deborah Sanatorium, Dr. M. James Fine, Newark, Dr. B. J. Ellmers of New Milford, Mr. George M. Buch, Mercer Hospital, Dr. Emil Frankel, Division of Statistics and Research, Department of Institutions and Agencies, Trenton.

From the Bergen Pines staff were present Drs. A. Louis Gramsch, Arthur Denchfield, Monroe Tanner, Grace Seagrave, Robert Lenz and Bernard Stolz.

The following members of the New Jersey Chapter are now serving with the Armed Forces: Major Irving L. Applebaum, Captain Paul K. Bornstein, Captain William M. Kennedy, and Captain Meyer T. Weissman.

## Organization News

SOUTHERN CHAPTER OF COLLEGE  
TO BE ORGANIZED

A luncheon meeting of the members of the American College of Chest Physicians in the southern states will be held at the John Marshall Hotel, Richmond, Virginia, Tuesday, November 10, at one o'clock.

A Southern Chapter of the College will be organized at this meeting and officers will be elected. Dr J Winthrop Peabody, Washington, D C, president of the College, will be the guest speaker.

Plans will be made for the Southern Chapter of the College to meet annually with the Southern Medical Association. The Southern Medical Association meets this year at Richmond, Virginia, October 10-12th. An excellent scientific program has been arranged for this meeting.

Dr Dean B Cole, Richmond, Governor of the College for Virginia, is the Chairman of the General Arrangements Committee for the Luncheon Meeting.

## ADDITIONAL LIST OF MEMBERS COMMISSIONED IN THE MEDICAL CORPS

*United States Army*

- Major Philip H Narodick, Seattle, Washington, stationed at U S General Hospital, Unit 50, Camp Carson, Colo
- Captain George F Evans, Clarksburg, West Virginia, stationed at 29th Station Hospital, Camp Rucker, Alabama
- Captain Henry Felson, Cincinnati, Ohio, stationed at Army Medical Center, Washington, D C
- Captain Joseph G Rosenbaum, Brecksville Ohio, stationed at Morrison Field, West Palm Beach, Florida
- 1st Lieut Elmer E Kottke, Des Moines, Iowa, stationed at Fitzsimons General Hospital, Denver, Colorado
- 1st Lieut David A Nathan, Miami Beach, Florida, stationed at Station Hospital, Camp Maxey, Texas
- 1st Lieut Jacob Schloss, Middletown, New York, stationed at Westover Field, Chicopee Falls, Massachusetts
- Lieut Colonel Howard B Kellogg, Seattle, Washington, stationed at General Military Hospital No 50, Camp Carson, Colorado
- Major Roger J Hanna, Jackson, Michigan, stationed at Bushnell General Hospital, Brigham City, Utah
- Major George L Leslie, Howell, Michigan, stationed at Stark General Hospital, Charleston, South Carolina
- Major Thomas O Nuzum, Janesville, Wisconsin, stationed at Salt Lake City, Utah
- Major Stuart Yntema, Saginaw, Michigan, stationed at Hospital Station 1605, Fort Custer, Michigan

*United States Navy*

- Lt (jg) Harry E Tebrock, Atlantic City, New Jersey, stationed at Potomac Annex Bldg No 5, Washington D C
- Lieut Abraham Feinberg, New York, N Y, stationed at U S Naval Hospital Philadelphia, Pa
- Lieut Joseph C Placak Jr, Cleveland, Ohio, stationed at U S Naval Hospital, Great Lakes, Illinois
- Lieut Charles A Seelig, Jackson Heights, L I, New York, stationed at Navy Yard, New York, New York

## CHANGES OF ADDRESS

- Dr Harry Joseph Treshler, formerly Pennsylvania State Hospital, Cresson, Pa, now at Michigan State Sanatorium, Howell, Mich
- Dr Louis J Miller, formerly 3215 W North Ave, Chicago, Illinois, now at 2021 N Whipple St, Chicago, Illinois
- Dr Sherwood C Lynn, formerly 222 E Jones St, Savannah, Georgia, now at 118 E Jones St, Savannah, Georgia
- Dr Norman W Heysett, formerly Edward Sanatorium, Naperville, Illinois, now at Irene Byron Sanatorium, Fort Wayne, Indiana
- Dr Thomas L Dwyer, formerly State Sanatorium, Mt Vernon, Missouri, now at Vandalia, Missouri
- Dr Arthur E Lamb, formerly 430 Clinton Avenue, Brooklyn, New York, now at 339 Washington Avenue, Brooklyn, New York
- Dr Walter C Reineking, formerly Lake View Sanatorium, Madison, Wisconsin, now at Greenwell Springs Tuberculosis Hospital, Greenwell Springs, Louisiana
- Dr W A Beasley, formerly Box 207, Stillwell, Oklahoma, now at Kings-Tulare Joint Tuberculosis Sanatorium, Springville, California
- Dr Allen A Tombaugh, formerly Rocky Glen Sanatorium, McConnelsville, Ohio, now at Pleasant View Sanatorium, Amherst, Ohio
- Dr Philip C Welton, formerly Buena Vista Sanatorium, Wabasha, Minnesota, now at 130 S Scott St, Tucson, Arizona
- Dr Richard M Burke, formerly Western Oklahoma Tuberculosis Sanatorium, Clinton, Oklahoma, now at 117 N Broadway, Oklahoma City, Oklahoma
- Dr Herbert F Schwartz, formerly Robert Koch Hospital, Koch, Missouri, now at 50 Elsmere Avenue, Elsmere, New York
- Dr Leon J Galinsky, formerly State Sanatorium, Oakdale, Iowa, now at Fort Logan, Colorado
- Dr T Ashby Woodson, formerly Waverley Hills Sanatorium, Waverley Hills, Kentucky, now at 72 Valley Road, Louisville, Kentucky
- Dr Charles A Seelig, formerly 104 East 40th St, New York, N Y, now at 33-17 70th Street, Jackson Heights, L I, N Y
- Dr William L Cooke, formerly 404 Brooks St, Charleston, W Va, now at 5 Roller Road, Charleston, W Va
- Dr E J Thomas, formerly 441 Washington Ave, Miami Beach, Fla, now at 8834 Abbott Avenue, Miami Beach, Fla
- Dr P C Burnett, formerly Battle Hill Sanatorium, Atlanta, Georgia, now at Saginaw County Hospital, Saginaw, Michigan
- Dr Herbert Weinberger, formerly Healthwin Hospital, now at Ahwahnee Sanatorium, Ahwahnee, California
- Dr Lawrence M Serra, formerly 104 W Madison St, Baltimore, Maryland, now at 11 East Chase Street, Baltimore, Maryland
- Dr John K Shumate, formerly Pureair Sanatorium, Bayfield, Wisconsin, now at Lake View Sanatorium, Madison, Wisconsin
- Dr Joseph Walsh, formerly No 921 Penn Athletic Club, Philadelphia, Pa, now at Hotel Belgrave, 1811 Chestnut St, Philadelphia, Pa
- Dr F H Alley, formerly Victor C Vaughn House, Ann Arbor, Michigan, now at Oakville Memorial Sanatorium, Oakville, Tennessee
- Dr Thomas C Black, formerly State Tuberculosis Sanatorium, Orlando, Florida, now at Western Oklahoma T B Sanatorium, Clinton, Oklahoma

## DR PECK DECEASED

As we go to press with this issue of the Journal, we are shocked to learn of the sudden death of Dr John H Peck, Oakdale, Iowa

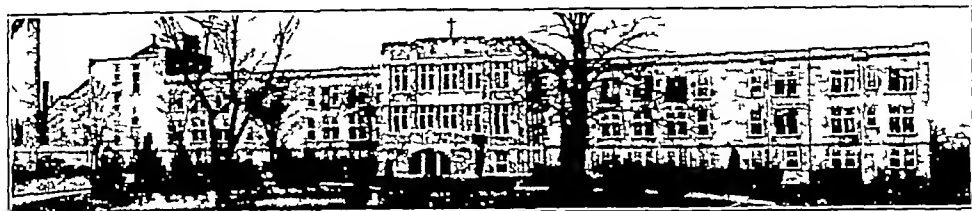
Dr Peck died at the Iowa State Tuberculosis Sanatorium of a coronary thrombosis October 19th

He served as the president of the American College of Chest Physicians from 1940-1941. He also held high office in many other organizations. He

served as the president of the National Tuberculosis Association and the Iowa State Tuberculosis Association

We know that his many friends throughout the world will mourn his loss. When notice of his death was received, plans for his funeral were still pending.

A detailed obituary of Dr John H Peck will be published in a future issue of *Disease of the Chest*



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## IN MEMORIAM

DR WARREN C BREIDENBACH

1894-1942

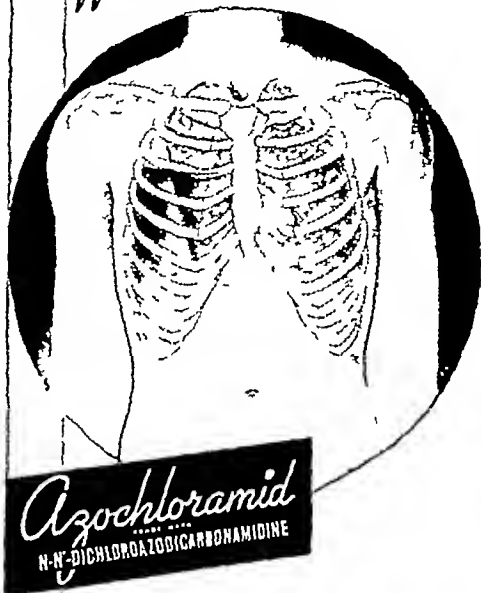
Dr Warren C Breidenbach died at Dayton, Ohio, on June 30, 1942. His death was an untimely loss of a hard and enthusiastic worker in the field of tuberculosis. Renal disease for many years culminated in the inevitable cardiac and arterial damage with circulatory failure. Dr Breidenbach was born in Piqua, Ohio, January 27, 1894. Following his graduation from high school at Piqua, he attended the Ohio State University for one year. He completed his academic work at the University of Michigan and was then graduated in Medicine from the same institution in June, 1917. He served his internship at the Miami Valley Hospital in Dayton, Ohio. In July, 1918, he was appointed house physician at the same hospital and served in this capacity for one year. In February, 1920, he was appointed Medical Superintendent of Stillwater Sanatorium and served in this capacity until his death. He has always been actively identified with local, state and national organizations in the field of diseases of the chest. He was consultant in diseases of the chest at the Miami Valley Hospital, Good Samaritan Hospital in Dayton, Ohio, and also to the United States Soldiers' Orphans Home at Xenia, Ohio. He was a Fellow of the American College of Physicians and American College of Chest Physicians, a Diplomate of the American Board of Internal Medicine, Associate Fellow of the American College of Thoracic Surgery, and a member of the American Trudeau Society. He made numerous valuable contributions to medical literature in the field of respiratory diseases, particularly in the use of the Laminograph in x-ray study of the lung.

He was married to Elaine Hoyt Rasch of Detroit, Michigan. Surviving him are his wife, a son Warren, Jr, now in his second year of Medicine at Harvard University, Elise Jane who just completed two years of study at the Connecticut College for Women, and Frederick who is attending Oakwood High School.

Warren won and enjoyed close and wide friendships among his medical colleagues throughout the country. He was devoted to his home and family. I remember particularly that one year ago he showed me a letter he had just received from his son, Warren, Jr, who was then a freshman at Harvard University Medical School. Warren, Jr, had just attended the opening convocation address at the Medical School. In this splendid letter he spoke of the deep inspiration he had just received from the address. He then told of the great devotion he had for his home and his father and how this address had been only a renewal of much inspiration he had received previously from his father for the study and practice of medicine. It was only another example of Warren giving and transmitting true enthusiasm for the practice of medicine which he loved.

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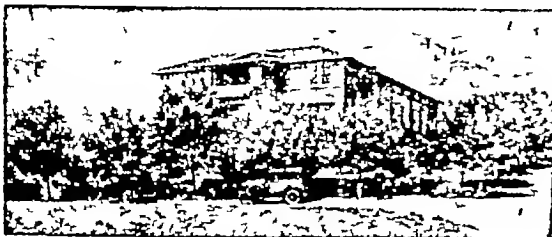
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BY SUCTION MACHINE IN THE ASPIRATION OF  
FLUID COMPLICATING ARTIFICIAL  
PNEUMOTHORAX (Page 294)

Kenneth E Gardner M D, Bloomfield, New Jersey

PNEUMOPERITONEUM WITH PHRENIC  
PARALYSIS (Page 296)

Leon G Woodford M D, Everett, Washington

PNEUMOTHORAX (Page 301)

Brooks D Good M D Colorado Springs, Colorado

WHY THE LATE ENTRY INTO THE  
SANATORIUM? (Page 305)

Victor A Lookanoff, M D, Hawthorne, Wisconsin

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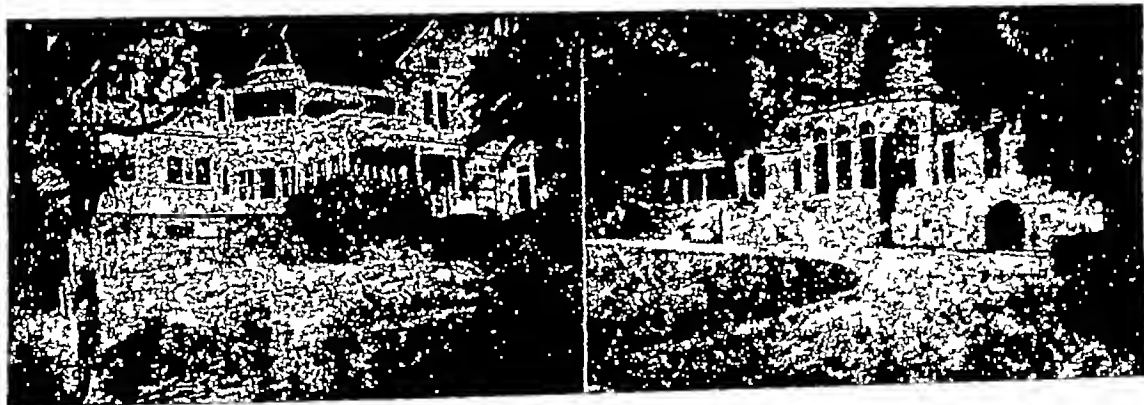
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# War Time Upswing in Tuberculosis Reported— VIGILANCE NECESSARY!

## TUBERCULIN PATCH TEST (Vollmer)

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TUBERCULOSIS ALREADY APPEARS ON THE INCREASE in the warring nations in the second world conflict. From fragmentary data available it appears that a rise in tuberculosis mortality has commenced in England, Wales and Scotland<sup>1</sup>. Hong Kong reported 5,751 deaths from tuberculosis in 1940 against 4,443 the year before<sup>2</sup>. In the United States, the downward trend of the disease is slowing up, according to the National Tuberculosis Association, which warns that tuberculosis may soon show a war time increase.

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<sup>1</sup> LONG E. R. Am Rev Tuberc. 45:616 (June) 1942.

<sup>2</sup> Editorial M. Rec. 154:440 (Dec. 17) 1941.

<sup>3</sup> COHEN P. (Santa Barbara County Health Dept. Santa Barbara California) California & West Med. 56:70 (Feb.) 1942.

<sup>4</sup> NARODICK P. H. (Supt. and Med. Director King County Tuberculosis Hosp. Seattle Wash.) Northwest Med. 41:195 (June) 1942.

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August 1, 1942

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Robert P. Patterson  
Under Secretary of War



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## Editorial Comment

### A Note of Caution

The present conflict has raised new problems in tuberculosis control. With the stripping of hospital staffs, many institutions are faced with the task of attempting to render adequate medical care by making greater demands upon the physicians who have been left to carry the load, or else be faced with the problem of curtailing some of their beds. Neither of these will prove of benefit in the control of tuberculosis.

What meager statistics have come out of the European countries, reveal that there has been a tremendous increase in tuberculosis mortality. This has been due in part to the utilization of beds formerly used for the tuberculous, now being used for the hospitalization of war casualties. Positive sputum tuberculous patients are mingling freely with the well population, and it is needless to say that a new crop of tuberculosis patients will result. In fact, in many countries this has already come about.

In this country, we have enjoyed a steady decline in the mortality rate from tuberculosis. It is going to be the duty of each and every physician to zealously guard against encroachment upon this splendid record. In many states tuberculosis has reached a figure where it would be comparatively safe to state that the disease was well under control. In other states, of course, there is still a high death rate. In those states our efforts should be accelerated even under war conditions. Sufficient physicians should be allocated for the proper care and treatment of the tuberculous and no institution should be allowed

to curtail necessary care or be permitted to close down needed bed capacity.

It is going to be the duty of every physician serving in the armed forces of our country to keep down the rate of tuberculosis morbidity among our soldiers, sailors and marines, and an added responsibility will rest with the physicians in civilian life to maintain the status quo, or if possible, to continue the progress which has been made to date.

I feel deeply indebted to the Illinois Chapter of the American College of Chest Physicians and to my many other friends present here tonight for this splendid tribute.

Jay Arthur Myers, M.D.

### Middle Atlantic States Issue

The November issue of "Diseases of the Chest" will be a special issue of

the journal. Material compiled from the states of New Jersey, Pennsylvania, Delaware, Maryland and the District of Columbia will be featured in the November issue. It will be known as the Middle Atlantic States Issue. In addition to scientific articles written by physicians in those states and the District of Columbia, the issue will contain photographs and descriptions of most of the sanatoria in those states and the District of Columbia. This special issue will be another in the series of such issues of the journal which have been published during the past eight years.

R C M

# Control of Negative Pressure Produced by Suction Machine in the Aspiration of Fluid Complicating Artificial Pneumothorax

KENNETH E GARDNER, M.D.  
*Bloomfield, New Jersey*

One of the most frequent complications of artificial pneumothorax is the development of pleural effusion. Various estimates place its occurrence between 50 per cent and 90 per cent of all patients at some time during their course of artificial pneumothorax therapy. Many of these cases give no symptoms and the presence of fluid is detected only by routine fluoroscopic examinations.

When the amount of the effusion is small, it does not present a serious problem but when the amount is sufficient to produce pressure symptoms on the adjacent structures, it is necessary to consider the removal of some or all of the effusion to relieve these symptoms. The improper removal of the effusion, however, may produce a group of symptoms more severe than those produced by the fluid itself.

In uncontrolled cases the cause of the symptoms after the removal of the effusion is due to the resulting high negative pressure instead of the positive pressure produced by the effusion.

Since the formation of fluid requires days or weeks, the positive pressure is built up gradually and the circulation adjusts itself to the shifting mediastinum. When the fluid is removed, however, its withdrawal is performed in a relatively short time, i.e., minutes as compared to the days or weeks required for the fluid to develop, and its removal may be accompanied by unpleasant and sometimes alarming symptoms if it is not properly controlled.

These symptoms are due to the uncontrolled increase in intrapleural negative pressure which produces a compensatory shift of the adjacent tissues and organs toward the negative pressure side of the thorax. If the shift is rapid, the following symptoms may occur: dyspnoea, cough, pressure in the chest, weakness and signs of circulatory embarrassment with palpitation, cyanosis and shock.

Several or all of these symptoms may develop and will vary in severity with the degree of negative pressure produced, the length of time it persists and the means taken by the operator or the adjacent tissues and organs to compensate for it.

In uncontrolled cases where the aspiration of fluid frequently produces a high negative pressure which is not relieved by the introduction of air, the high negative pressure must be compensated for by the patient in one of several ways or a combination of them, i.e., there is a shift of the mediastinum to the side of the negative pressure, the diaphragm rises, the intercostal spaces decrease, the lung re-expands, or there is a rapid recurrence of fluid. Sometimes the mediastinum, diaphragm and lungs are fixed by thickened pleura or adhesions and cannot help to relieve the negative pressure. The only alternative on the part of the thorax is to produce fluid again as rapidly as possible.

Various methods have been used to remove pleural effusions but the two most common are the hand syringe and the suction machine. Although this paper deals with the controlled use of the suction machine for the aspiration of fluid, the use of the hand syringe (50 cc) is the method of choice in certain cases and is safer than the suction machine. The hand syringe is a slow, tedious process, however, when a large effusion is present but it is to be recommended for small or encapsulated effusions or when a diagnostic tap is to be made.

Regardless of which method is used, it is necessary to introduce air into the pleural cavity to overcome the partial vacuum or negative pressure which is produced by the withdrawal of the effusion. The amount of air required is usually less than the volume of fluid removed. If the syringe method is preferred, a simple guide is to introduce about

half a syringe full of air for each syringe full of fluid removed

For large pleural effusions the suction machine is now commonly employed. Although this method is more rapid than the syringe method, it is more dangerous from the standpoint of producing and maintaining a high and rapid increase in negative intrapleural pressure. Because of this danger, the use of the pneumothorax machine will be described as a means of keeping a constant check on the intrapleural pressure and also as a means of introducing air into the pleural space as required.

The patient is first examined fluoroscopically to determine the height of the fluid level and a line drawn on the skin with a wax pencil at this level. The patient is then placed in the sitting position and two areas on the back prepared with antiseptic solution

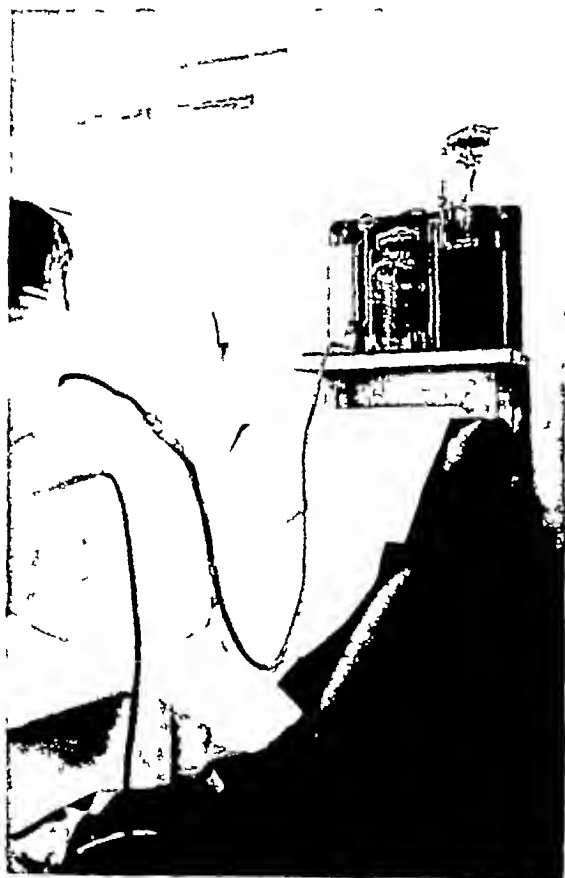


FIGURE 1

*The upper needle is inserted above the line of the fluid level and connected to the pneumothorax machine through a filter-adaptor. The lower needle is inserted in the 10th interspace and the tube is connected to the bottle to trap the fluid in the suction line.*

and novocaine—one area above the fluid level and the other in the 9th or 10th interspace. In the upper area an ordinary pneumothorax needle is inserted, connected with the manometer side of the pneumothorax machine and the fluctuations noted. Although the effusion exerts a positive pressure because of its weight, the pressure readings above the fluid may still be negative on inspiration, or they may be positive. A small cannula is then inserted in the interspace selected for the withdrawal of the fluid. A three-way or T valve adapter is connected between the aspirating needle and the rubber tubing attached to the suction machine. A gallon bottle is connected in the suction line to trap the fluid. The manometer side of the pneumothorax machine is kept open as the suction is applied (See Fig 1).

The fluid should be removed in small quantities (150-250 cc) at a time and then sufficient air introduced from the pneumothorax machine to bring the pressure to zero. However, if the manometer reads -10 to -12 on inspiration before 150 cc have been removed, the suction should be temporarily discontinued, the suction broken by admitting air into the suction line through the T valve and air introduced from the pneumothorax machine until the readings are approximately zero. This procedure is repeated until sufficient fluid has been withdrawn.

The introduction of air prevents the unpleasant symptoms and also facilitates the removal of the fluid since it relieves the partial vacuum and thus requires less suction. The quantity of air introduced is usually less than the amount of fluid withdrawn. The actual amount is relatively unimportant. The important factor is to equalize the negative pressure. The final pressure is adjusted to zero after the last portion of fluid is removed.

As long as the aspirating needle remains in the effusion, the negative pressure rises slowly and in proportion to the fluid removed. However, as the fluid level drops there is a point where the aspirating needle enters the air space above the fluid. There is now a sudden withdrawal of the air from the pleural space. The negative pressure shoots up rapidly and the patient usually complains of feeling weak, dyspnoeic and may show signs of shock. These sudden symptoms are due to a rapid mediastinal shift and circulatory

embarrassment. If the negative pressure is not quickly relieved by the operator, the patient may develop definite signs of circulatory and respiratory embarrassment which may last for several hours or days. These symptoms continue until there is partial re-expansion of the collapsed lung or until sufficient fluid can accumulate to help relieve the mediastinal shift and high negative pressure.

When the fluid level drops below the point of the aspirating needle and the air above the fluid is suddenly withdrawn, the suction should be stopped immediately, the suction broken by admitting air into the suction line through the T valve and sufficient air introduced from the pneumothorax machine to equalize the negative pressure. This is the critical point with most patients and the place where controlled pressure readings are most important. It provides a method for immediately equalizing this rapid rise in negative pressure. If this high negative pressure is not relieved immediately, some or all

of the signs and symptoms previously mentioned will develop.

If it is considered desirable to remove more fluid after the fluid level has dropped below the point of the aspirating needle, the needle can be tipped downward and the patient supported so that he can lean slightly backward, keeping the spine stiff and bending from the hips. Once this critical level has been reached, further aspiration should be continued cautiously. If the fluid level has dropped to the 10th rib posteriorly, it is usually not necessary to completely drain the entire effusion since more fluid frequently develops or the residue becomes absorbed. The final pressure should be adjusted to zero.

Patients who have had their fluid removed by the controlled method feel no ill after-effects and the procedure can be carried out in the office when the proper equipment is available and the patient is ambulatory.

45 Fremont Street

## Pneumoperitoneum With Phrenic Paralysis

LEON G. WOODFORD, M.D., F.A.C.C.P.\*  
Everett, Washington

### *Brief History of Phrenic Paralysis*

The early operative procedures for phrenic paralysis or neurectomy were reported from 1912 to 1922 by Stuetz, Bardenhuer, Ochlecher, Sauerbruch, Ralph Matson, Felix, Goetz, John Alexander, and others.

Avulsion, exeresis or permanent paralysis are not so often used as formerly. Most American workers have followed John Alexander and others in merely crushing the nerve and resecting the accessory roots, thus obtaining temporary phrenic paralysis.

**Indications**—Either alone, or more often in combination, it is a valuable procedure in the control of active tuberculosis. Due to subsequent complicating involvement of another lobe or lung and its insufficiency alone as compared with pneumothorax, it is now less used. It is more often indicated in combination with some other form of lung collapse. It aids in lower lobe involvement. It

is sometimes used when pneumothorax is indicated but cannot produce collapse or satisfactory partial collapse, on account of adhesions, even after intrapleural pneumolysis,<sup>3</sup> for economic reasons when pneumothorax cannot be used, in exceptional cases in combination with thoracoplasty, in some cases following pneumothorax, in combination with pneumoperitoneum when pneumoperitoneum is indicated and additional collapse on the most involved side is needed, on the collateral lung instead of bilateral pneumothorax.

**Contra-indications**—It is contra-indicated (a) when more effective or less radical methods of treatment are applicable without it, (b) in bronchial asthma, emphysema or marked dyspnoea, (c) when it will obviously be inefficient for collapse purposes on account of adhesions, or on account of the extent, location or exudative type of disease,<sup>3</sup> (d) with heart and renal complications. Poor final results and complications arising from later extension of tuberculosis involvement have increased the contra-indications for per-

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manent phrenic paralysis except when definitely and permanently indicated

Phrenic neurectomy<sup>3</sup> or pneumoperitoneum should be considered next after pneumothorax and pneumolysis, and before more radical collapse measures are contemplated

### *Pneumoperitoneum*

Pneumoperitoneum has been used since 1902 for diagnostic purposes. Since about 1917 it has been used for intestinal and peritoneal tuberculosis. It is a form of collapse therapy applicable to selected cases of pulmonary tuberculosis, lung abscess and bronchiectasis. It does not produce as complete a degree of collapse as a satisfactory pneumothorax. Banyai<sup>4</sup> reported on this subject in 1931, and more recently in 1940.<sup>5</sup> Hobby<sup>6</sup> wrote concerning it in 1938 and Burge<sup>7</sup> published an excellent article in 1938.

*Indications* for artificial pneumoperitoneum in the treatment of pulmonary tuberculosis are as follows

1) Pneumoperitoneum is indicated in certain cases of bilateral pulmonary tuberculosis too acutely ill or too extensive for bilateral pneumothorax. In cases following an attempt at pneumothorax, or after a phrenic neurectomy, especially if vomiting or definite symptoms of abdominal tuberculosis are present. Pneumoperitoneum may be used in the presence of dyspnoea, marked emphysema or allergic bronchial asthma, as it is controllable, and need not and usually does not produce appreciable dyspnoea.

2) If artificial pneumothorax is indicated but cannot be established or made effectual, either pneumoperitoneum or phrenic or both are next considered.

3) Severe hemorrhage not controlled by better means.

4) Following pregnancy.

5) Following reactivation of the tuberculous process after pneumothorax has been discontinued and pneumothorax cannot be re-established.

6) After phrenic nerve paralysis<sup>6</sup> when sputum remains positive and collapse or rise of the diaphragm are insufficient.

7) In bilateral pulmonary tuberculosis complicated by abdominal tuberculosis or basal bronchiectasis.

8) When pneumothorax is disregarded on account of the advanced age of the patient.

9) In addition to pneumothorax in which basal collapse is desired but prevented by adhesions.

10) In addition to pneumothorax when abdominal tuberculosis occurs or persistent vomiting attacks and anorexia, or unexplained abdominal pain develops.

*Contra-indications* are as follows

1) When satisfactory results can be obtained by available and more orthodox methods of collapse, pneumoperitoneum does not collapse the lung sufficiently to compete with nor supplant them. In pulmonary bilateral cases it may supplement pneumothorax or phrenic paralysis.<sup>6</sup>

2) Generalized tuberculosis.

3) Amyloidosis.

4) Diseases of the aorta and coronary arteries.

5) Cardiac decompensation or myocardial insufficiency.

*Risks or Disadvantages* of pneumoperitoneum which must be controlled or avoided are

1) The gas or air is absorbed at approximately twice the rate from the abdominal peritoneum as from the unilateral pleura. Refills which at first are given twice weekly, may later be extended to weekly with air and fortnightly with nitrogen.

2) Visceral puncture near adhesions or hemorrhage from vessel puncture.

3) Fluid in the peritoneum may be present or develop later, but does not often persist and seldom interferes with treatment.

4) Less complete collapse of lung is obtained than with satisfactory pneumothorax or thoracoplasty.

5) Tissue or mediastinal emphysema may develop above the diaphragm or within a hernia.

6) Gas embolism may and has occurred. Most careful technique is *imperative*. Peritoneal shock may occur from too sudden distension of the abdomen. Pain in the abdomen may require codeine in some cases after early refills, or discontinuance of pneumoperitoneum.

*Advantages of Pneumoperitoneum* are as follows

1) The pressures for collapse are controllable.

2) Bilateral or selective collapse in the most diseased area is favored.

3) There is less danger of spontaneous collapse than with pneumothorax

4) X-ray and physical pulmonary findings are not obscured

5) More uniform upward pressure under the diaphragm can be made by continuously wearing an elastic abdominal belt between refills

6) Pneumoperitoneum does not interfere with nor replace the routine diet for abdominal tuberculosis nor calcium therapy nor ultra-violet radiation

*Physiological Changes* produced are as follows

1) Lymph stasis and fibrosis are favored

2) Tissue anoxemia and congestion are less favorable for the growth and spread of aerobic tubercle bacilli

3) Fifteen to 35 per cent reduction in chest capacity with the decreased vertical length of the lung

4) Decreased movement and relaxation of tissue around cavities and areas of exudative tuberculosis

5) Relief of toxemia and vomiting and improvement of or recovery from abdominal symptoms or complications

6) The psychic effect favors recovery since the patient feels that something is being done

*The Technique of Pneumoperitoneum* is easily learned by those doing pneumothorax as it is very much the same procedure. Below the diaphragm the absence of negative pressure makes precaution of technique and tactile sense most necessary, in order to know that the blunt needle point is placed just through the parietal peritoneum and not in a tissue or blood vessel. At the initial fill the patient is supine or slightly turned on the right side, with the head and chest and upper abdomen raised at an angle of about 15 to 25 degrees, the stomach empty and the abdomen relaxed.

With strictly aseptic technique, through a 24 to 27 gauge  $1\frac{1}{2}$ -inch needle,  $\frac{1}{2}$  to 2 per cent novocaine (2 to 5 cc), is injected immediately below the left costal border, just outside the border of the rectus muscle, subcutaneously and nearly to the peritoneum. After puncture of the skin, one may carefully advance the blunt Floyd needle with the water manometer attached to and just through the peritoneum. A few cc of air is injected. Any undue rise of pressure or pres-

sure pain felt by the patient warns one that the needle point is not correctly placed or that adhesions may be present.

I prefer to use a blunt  $2\frac{1}{2}$ -inch 19 gauge needle on a 5 cc syringe of novocaine solution ( $\frac{1}{2}$  to 2 per cent), forcing the solution ahead of the needle carefully, feeling and guiding the needle through the tissue layers of the abdomen with the left hand, to and just through the sensitive parietal peritoneum, stopping when the release of pressure is felt, the instant the needle end is through the peritoneum.

Inject the remaining few cc of novocaine and check for any blood through the needle by slight aspiration. Connect the manometer directly or through a three-way connector. The amount of gas injected depends upon the manometer pressures and upon the feeling of fullness of the patient. After the gas pocket is formed, positive fluctuation may be noted with each inspiration and tympany over the gas pocket or liver. Three hundred, 500, 1,000, 1,500 cc may be injected at each refill. Pressure should not go above 4 cm of water at the first injection.<sup>7</sup> The patient should be warned that there will be slight discomfort of the shoulders immediately after the first injection.

Subsequent refills every 2 to 4 days may be increased by 1 cm of water pressure at each refill up to 9 to 11 cm. Frequent fluoroscopic observations in the upright position and film control are necessary. After the visualization of a definite gas pocket below the diaphragm, one may do the subsequent puncture more conveniently with a short beveled 20 gauge  $2\frac{1}{2}$ -inch rustless needle attached to a 2 cc syringe of novocaine (2 per cent) solution. Doctor Banyai<sup>5</sup> prefers to give the first injection three fingers breadth below and to the left of the umbilicus. I find that with the firmer support of the rather thin abdominal wall immediately below the left costal border that I can more exactly slowly pierce the peritoneum without plunging suddenly through, and without unfavorable pressure inward upon the underlying viscera.

Oxygen is preferred by some physicians, and is safely and quickly absorbed in case of accidental injection into a vein. Also, it is thought to have a more favorable influence on the tuberculosis of the abdomen.<sup>7</sup> Air is most available. It is absorbed half as quickly



as oxygen. Later refills of air at weekly intervals are more practical for maintaining pneumoperitoneum space and pressures. Nitrogen is advisedly indicated in the presence of febrile peritoneal reactions following refills or of peritoneal fluid.

### *Combined Phrenic Paralysis and Pneumoperitoneum*

The present report is based upon five cases on which the writer performed both procedures during 1938 and 1940.

*Indications*—When one or more of the previously enumerated indications are present for phrenic paralysis or pneumoperitoneum, much additional necessary unilateral collapse may be obtained by combining the two procedures in the following situations:

1) When both lungs are involved and other available forms for needed collapse are considered less suitable and cavitation of the most involved lung is not too rigid nor extensive for probable effective collapse.

2) In essentially unilateral cases after phrenic paralysis, when additional rise of the diaphragm is needed, sputum remains positive and it is expected that closure of cavities and conversion of sputum can be accomplished. The procedure is especially suitable for a persisting basal lesion, or when persistent vomiting is present after left phrenic.

3) With pneumoperitoneum for abdominal symptoms when the worst lung requires additional rise of the diaphragm by phrenic paralysis.<sup>9</sup>

4) A few selected advanced cases,<sup>8</sup> otherwise hopeless, who may respond favorably to pneumoperitoneum or to the combined treatment or may later become amenable to thoracoplasty, or extrapleural pneumothorax, etc. In this group discretion is necessary or treatment may prove to be only palliative or even harmful.

### *Conclusions*

1) Meddlesome or hopeless collapse is condemned and should be avoided. Some failures may be anticipated by the physician but too many will discourage indicated future use of helpful methods of collapse.

2) When phrenic paralysis and pneumoperitoneum are indicated better results will usually be obtained if the phrenic is done first.

3) The simplest effective indicated available methods of collapse should be considered before dangerous radical procedures are contemplated.

4) Pneumoperitoneum and phrenic paralysis may be combined to secure partial, but often sufficient collapse of one or both lungs to produce the best and least deforming end results obtainable in some indicated cases of difficult reactivated or complicated or chronic moderately advanced or advanced pulmonary tuberculosis.

"It is safe to say that the addition of diaphragmatic paralysis doubles the effective (unilateral) collapse possible with pneumoperitoneum."<sup>9</sup> In one case 50 per cent of collapse of the left lung volume was obtained.

"The increasing use of pneumoperitoneum as a method of collapse in individuals in whom pneumothorax cannot be accomplished has opened up a new field for the use of diaphragmatic paralysis."

### *Case Reports*

*Case No 1041*—Miss H O, Swedish female, age 18, high school student. Has had contact with two members of her family who had died from pulmonary tuberculosis. Had jaw broken in automobile accident in 1936. Has had cough for several years. Acutely ill for the past six weeks. "Had known she had tuberculosis a long time," but feels utterly helpless and hopeless to combat it. First seen June 10, 1938. Diagnosis: Right lung mixed infiltration hilus and right upper lobe. Progressive rales to 4 ds and 2 r moderately advanced progressive. Left lung exudative pneumonic caseous cavernous, 2 lobes (cavitation 2 to 4 cm). Rales to 5 r 6 ds. Advanced C rapid-sputum positive, weight 94 pounds. Vertical measurement right 20.5 cm, left, 22 cm (Film 1).

Rest dietetic regimen instituted. Hemoglobin 59 per cent, sedimentation rate 28. She denies previous pleurisy. During July, August and September six attempts at pneumothorax failed to find space and no air was injected. July 3, 1938, temperature range 97.4°-100.2°, pulse 80-120. September and October amenorrhea—October abdominal symptoms, persistent vomiting, pain in abdomen with increased temperature. Anorexia, toxemia, loss of weight from 104¼ to 94 pounds. October 15 to November 15—Thoracoplasty.

contra-indicated, too ill, and bilateral involvement December 1—*Oxyperitoneum begun*, 700 cc, end pressure 4 cm Some pain in shoulders Temperature  $101^{\circ}$  dropped to  $99^{\circ}$ , on following day rose to  $103.2^{\circ}$  fourth day December 7—temperature  $101^{\circ}$ , oxygen 1,000 cc Manometer  $+5\frac{1}{2}$  December 12, oxygen 1,000 cc Manometer  $+7$

December 15—Air 100 cc Manometer  $+7\frac{1}{2}$  December 22 (S)—Sputum less =15 cc in 24 hours January 15, 1939—Much improved, better appetite, feels much better, less toxic —S=12 cc Has stopped vomiting since gas, gained some weight 3 14, S=22 cc Vertical chest left, 16.5 cm

March 29—Left temporary phrenic paralysis (palliative) with good increased rise of diaphragm March 10 film showed increase in cavity at apex Weight  $93\frac{1}{2}$  pounds June 7, 1939 (Film II) August 10—Sputum=2 cc Pain right caecum, end pressures reduced  $+9$  to  $+7$  to  $+8$  cm Vertical chest left 13.5 cm Feels better, increased abdominal pressures only pushed right diaphragm up farther November 23, 24—Home three days Thanksgiving S=6 cc Manometer 9 cm Sedimentation rate 65, temperature  $97.6^{\circ}$ – $98^{\circ}$ , pulse 84–96 undisturbed January 28, 1940—A little fluid in peritoneum but has continued to improve since March 27, 1940 (Film III) Left chest 13.5 cm April 11—S=3 cc May 9—Diaphragm has descended some Sputum increased Cavity still present, left apex

At fourteen months, June 3, 1940—Temporary phrenic (left) repeated Weight  $89\frac{1}{4}$  pounds June 6—Good paradoxical movement of the diaphragm raised 1.5 cm more by second phrenic Left chest decreased from 22 to 12 cm in vertical depth or 10 cm or about 50 per cent plus decrease of volume July 11—

Home, gained three pounds, to  $96\frac{1}{4}$  pounds. October 2—Appetite good except at menses, some cramps interfere

October 9—Sedimentation rate 62 mm Eating for a few days Expectoration in 24 hours equals 0 to 1 cc December 4, 1940—Cavities all closed, 3 negative 3 day sputums, few rales only after cough, to left 6 ds only January 1, 1941—Prognosis and improvement continues excellent

Abdominal belt worn previously, had not been worn past two weeks Reapplied elastic belt Rales were not found at recent previous examination Refills every two weeks 500 to 800 cc, manometer end pressures  $+7$  to  $+8$  cm, before fills  $+5$  to  $+6.5$  cm Patient is allowed finger work, bathroom privileges Temperature  $97.6^{\circ}$  to  $98^{\circ}$  Premenstrual temperature  $99^{\circ}$ , weight  $88\frac{1}{2}$  pounds Theoretical standard weight 113 pounds, previous high 105 pounds Blood pressure 104/74, pp 30 Sedimentation rate 40 Previously on 12/20/39 was 115 mm at one hour Has had 72 refills in two years Has lost  $2\frac{1}{2}$  pounds since 2nd phrenic Heart under clavicle on left is raised perceptibly—beat 1st interspace—less dyspnoea than formerly I expect gain with increasing physical activity, to gradually decrease abdominal pressure in order to gain weight with present decreased toxemia, now that sputum is absent and negative Von Bernsdorf Nuclear count 226, October 19, 1940 (Nuclei of 100 polymorphonuclears) Houghton's Index to 166 has risen from a low on 2/22/1939 of 78 then with a low Nuclear count of 185 (Von Bernsdorf) An index of 200 or above is considered a satisfactory normal for discharge in otherwise apparently arrested cases This is a remarkable improvement in a patient with a previously bad prognosis

## CASE 1041



Film I



Film II



Film III

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## Pneumothorax

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Pneumothorax is an accumulation of air or gas in the pleural cavity and may be spontaneous or artificial. The latter is the more important, as it is widely and successfully used in the treatment of pulmonary tuberculosis.

Spontaneous pneumothorax is caused by rupture of the lung—thus allowing air to pass into the pleural cavity. There are a number of causes of this condition, but pulmonary tuberculosis is the major cause. Among lesser causes are abscess of lung, empyema, bronchiectasis, wounds and various other causes which weaken the visceral pleura. The cause in some cases is never determined. The symptoms vary from very little disturbance to those of severe shock, and sometimes sudden death occurs before the patient has time to seek medical aid. Usually the symptoms are sudden pain, dyspnoea, rapid pulse, cyanosis and a slight cough. These symptoms vary greatly in intensity. Physical examination reveals an increase in the respiratory rate, the breath sounds are faint or absent and there is a hyperresonant percussion note. If there is an effusion, there will be a shifting dullness in the base. A large opening may produce amphoric breathing. A metallic tinkle can be elicited if there is a complete collapse.

Treatment consists of complete rest in bed, with sedatives when indicated. Normally, the lung will re-expand in one or two months if there is no chronic disease which keeps the opening patent. If there is a valve opening which allows the air to enter but not return, it is usually necessary to insert a catheter and leave it in place to permit escape of air, thus

preventing too high intra-pleural pressure. The needle or catheter is left until there is an adjustment and the valve closes. In tuberculosis it is often desirable to prevent the re-expansion of the lung by artificial pneumothorax. This depends on the individual patient, that is, the amount of involvement in the good lung, the condition of the collapsed lung and other factors.

Sudden collapse of the lung is often the cause of death in lung injuries, such as knife stabs, gunshot wounds, broken ribs, etc. A quick insertion of a needle into the pleural space will many times save the life of such injured persons when it has been determined that the lung is collapsed.

Artificial pneumothorax has been used extensively only in comparatively recent years. Littré, in writing of Hippocrates, stated that Hippocrates had recommended, when a spontaneous pneumothorax occurred, it was sometimes desirable to fill a bladder with air and send it into the chest. Several other writers mentioned this method of treatment. John B. Murphy reported five cases in the late 19th century. Brauer in 1905 published works on pneumothorax and it was given world-wide attention. From that date artificial pneumothorax began to be used therapeutically more or less extensively.

Pneumothorax is the most satisfactory form of collapse therapy. Its mode of action is promotion of rest of the diseased areas. Cavity walls are brought into proximity in successful treatment. The extension of disease is held in check, as is the absorption of toxin. With active disease in the contra-lateral lung,

extreme care must be taken to prevent extension of disease in the uncollapsed lung, as sometimes increased function in the better lung may aggravate the disease. This form of therapy can be discontinued in such cases by withdrawing the air from the pleural space, or allowing it to absorb, if the lung still has the ability to re-expand.

The indications for collapsing the lung by this method vary widely and an individual study of every case is necessary. We do not attempt an initial pneumothorax until the patient has become adjusted to his surroundings and we have made a careful study of the symptoms, x-ray findings, laboratory reports and physical signs in the chest. Of course, in emergencies, such as bleeding or very severe symptoms, the observation period must be omitted and pneumothorax attempted at once. In far-advanced cases, with cavity formation, some form of collapse is indicated as early as feasible, and pneumothorax is the method of choice when possible. When the patient shows noticeable improvement in the observation period and there are no cavities, even though the sputum is positive, we do not hesitate to delay and, when indicated, let rest, fresh air and nourishment heal the diseased lungs, especially when there is no pleurisy, which might cause adhesions and prevent later collapse.

Pneumothorax is used in non-tuberculous disease, but not so widely as in tuberculosis. It has been used as a diagnostic aid in tumors of the lung, also it is sometimes used in pneumonia, but with unsatisfactory results. Sometimes pulmonary abscess is treated in this manner and in about 50 per cent of the cases reported to be satisfactory.

Seldom, if ever, does one see moderately or advanced tuberculosis in one lung without involvement in the other lung. Often the contra-lateral lung will show marked improvement after the collapse of a more diseased lung, in spite of the additional load it is forced to carry. Bleeding is usually an indication for an immediate attempt to collapse the diseased lung. It is often difficult to tell from which lung the blood is coming. Coarse bubbling rales can usually be heard in the lung that is bleeding and often the patient can feel from which side the blood comes.

Bilateral pneumothorax is often of great therapeutic value. In bilateral cavity disease

or in progressive bilateral disease this procedure is often useful. Extreme care in the degree of collapse is necessary and should be checked by physical and by fluoroscopic examination. Variations in the amount of collapse depend on the involvement in the lung on each side. When there is a complete collapse of one lung, it should be allowed to partially expand before attempting to institute collapse therapy in the other side, to safeguard as much as possible against an accidental total collapse by needle puncture or rupture of the lung due to some other cause.

The apparatus used by us is a simple one, made to order, with the minimum amount of valves and gadgets to get out of order. There are different types of machines on the market, but all involve the same principles. A bottle for storing the air or gas and a means of delivering this into the pleural space in measured amounts, connected with a manometer which registers the intra-pleural pressures. The simplest type is where water flows from one bottle into another, displacing air which passes through a rubber tube connected to a needle, the point of which is in free pleural space. The bottles are graduated and in this manner the amount of air displaced can be measured. By reversing the bottles, suction is obtained and a measured amount of air can be withdrawn. We use three needles, a small hyperdermic needle for anesthetizing the skin, a small calibre longer needle for continuing the anesthetization of tissues through the parietal pleura, and the large calibre pneumothorax needle. The latter should be dull for the initial treatment and several thereafter, then a sharp needle is feasible, after the lung is away from the chest wall. We use 2 per cent novocaine and air both for initial and refills.

The technic is simple, but extreme care must be used. The skin is anesthetized after preparation at the site selected, using 2 per cent novocaine, then the larger needle is slowly pushed between the ribs and the anesthetic introduced as the needle is inserted. The feel of the tissues determines the location of the point of the needle so that the operator can usually determine when the parietal pleura is reached. In an initial injection, one must be careful not to puncture the visceral pleura with the sharp-pointed

anesthetic needle In refills, where the lung is well away from the chest wall, such care is not necessary The larger needle is now introduced and connected to the apparatus In the initial injection there should be wide negative oscillations If there is only a small pocket, the oscillations will be narrow and not so negative, depending on the size of the pocket A cavity will give oscillations if the needle has punctured the lung, as will the lung A slight cough will cause a sudden change in pressure when the needle point is in free space Also a deep breath will cause wide manometer variations One should under no circumstances introduce air unless the manometer properly oscillates This precaution will many times save trouble and perhaps prevent an air embolism Be sure you are in free space before releasing air We have never had a fatality during pneumothorax injections since the author has been at Cragmor in thousands of treatments over nineteen years There have been several cases where the patient lost consciousness, but they were revived with no apparent harm Whenever possible, the patient should be in an institution for the initial injection, with all facilities for any emergency, and a physician unskilled in such work should first, under the observation of an experienced man, give refills, then, still under close observation by his instructor, begin initial injections Accidents happen with the most experienced and when it happens to one untrained in the danger and precautions, it is a greater tragedy

The intervals between injections of, and the amount of air vary with each patient As a rule, we never inject more than 300 cc with the initial treatment and sometimes even less, then on the following day 2-500 cc, depending on the pressure increase as the air is injected Refills are then made every 2-4 days for the first week or ten days, then the time is gradually extended according to the rate of absorption and the degree of collapse As a rule, the longer the patient takes pneumothorax, the slower the absorption, that is, up to several months or a year, when the absorption will usually be at a regular rate Until the interval between injections and the amount of air have become established, the patient should be examined at specified intervals, both by physical and fluoroscopic examinations

The intra-pleural pressure should be the minimum that will produce results, that is, keep the diseased part of the lung collapsed Often a 0 pressure will completely collapse a lung Too much variation in pressure is not advisable, and when the air is rapidly absorbed the intervals between injections should be shortened to compensate for same Permitting the lung to partially re-expand should be prevented as far as practical, as it seems to delay healing and promote effusion

The most serious danger in administering pneumothorax is gas embolism or pleural shock, thought by some to be the same thing, namely, air embolism This occurs more often in initial treatment, but may occur in refills Extreme care in withholding air until one is sure that the point of the needle is in free space will help prevent the occurrence of an embolism We feel that there is less danger of "pleural shock" when one anesthetizes the pleura slowly and well, first with a fine calibre needle Some men do not use anesthesia in refills and we have had patients who requested that no anesthetic be used They say that one quick puncture with the large needle is more satisfactory with them than the use of several needles Pleural shock or embolism may occur suddenly or there may be prodromal symptoms—hypersensitivity to pain during the administration should be watched particularly—then the eyes are usually fixed The patient is unconscious, or at least unable to speak, and may have muscular movements simulating convulsions

Marked effusions with serous, or purulent exudate, may be a complication Empyema occurs more often in long continued pneumothoracies Where there is no mixed infection, many time empyema may be treated by the closed method It may be necessary to establish open drainage by resecting a rib or several ribs

Extensive uncontrollable disease in the contra-lateral lung may necessitate discontinuance of pneumothorax Marked cyanosis and dyspnoea may make it advisable to discontinue refills or even to withdraw air, or bilateral pneumothorax may be indicated

There is no concensus of opinion regarding when pneumothorax should be discontinued There are wide divergencies of opinion, almost as divergent as who will win the war The condition of the lung before pneumo-

thorax was started should be carefully studied. We believe that when there was a large cavity or cavities that the pneumothorax should be continued indefinitely, as long as there is no contra-indication. Thick wall cavities many times will not heal even though the collapse has been continued for years. In less extreme disease the patient is advised of the dangers of allowing the lung to re-expand, and also of the danger of long-continued pneumothorax. Then we give him our opinion and let him express his desires in the matter.

In a communication from Dr. T. J. Kinsella of Minneapolis, he states "I am still of the opinion that a considerable number of pneumothoraces which were started for extensive disease for large cavities should never be discontinued. We are seeing more and more patients who come up for thoracoplasty who have given up a perfectly satisfactory pneumothorax sometime before and subsequently reactivated the disease in the original site." In a recent publication, "Artificial Pneumothorax," by Packard, Hayes and Blanchet, the statement is made that "In general it may be stated that the greater the involvement, the longer should the collapse be maintained. Far-advanced disease with cavity formation has, as a rule, been purposely confined by pneumothorax for periods of five or six years, or longer. Most operators advise this length of time." When it has been decided to allow re-expansion of the lung, the condition of the expanding lung should be watched both by x-ray and physical examination, and if signs and symptoms of active disease appear before pleural adhesions prevent it, the lung should be re-collapsed. The patient should continue his daily life under the same conditions he has been under while his lung was collapsed.

Difficulties may arise in the re-expanding side. The lung may fail to re-expand, due to stenosis of main bronchus, thickened pleura with pleural effusion or extensive fibrosis in the lung. As stated above, signs and symptoms of active disease may appear as an old cavity opens. Too often the cavity may seem to be closed until after the lung has been re-expanded and adhered, then it re-opens with all the adverse signs and symptoms. Increasing negative pleural pressure may cause discomfort and shifting of the thoracic organs. The most extreme case ever

seen by us of this shifting mediastinum was that of a man thirty years old who had been taking pneumothorax for ten years for extensive disease of the right lung. Six months previously he had a refill and was told to return in six weeks. He returned to a neighboring state and was not seen for six months. At this time he came back with extreme dyspnoea, and a very rapid pulse, 140-160. He was cyanotic and it seemed that he was near death. Dr. A. M. Forster, whom he had come to consult, advised an attempt to relieve him by injecting air into the pleural space and re-collapse his lung. The apex beat could be felt against the right chest wall. No evidence of free space could be determined by x-ray or physical sign. Dr. Forster stated that he had seen one other similar case in consultation and had advised such a procedure. It was not done and the patient died in a few hours. In the above instance a needle was introduced, marked negative oscillations obtained, air was introduced, the torsion of the thoracic vessels relieved and immediately all the patient's adverse symptoms disappeared. He went his way, stating that he was going to California, and has never returned for further treatment. Such an extreme case is very rare, but it may be necessary to relieve negative pressure by a small amount of air as the lung re-expands. Serous fluid often collects in the pleural space when the lung is re-expanding. It is not necessary to aspirate, and the fluid will gradually absorb. The mediastinum may be displaced toward the collapsed side, pulling the heart toward that side.

In conclusion, it may be said that artificial pneumothorax is a simple procedure, but should be studied in all its phases when a physician gives this type of treatment. He should at all times be careful in his technic and be prepared for treating any complication that may arise. Whenever possible, he should have access to a fluoroscope and it is often advisable to fluoroscope the patient before and after a refill. When a patient is traveling he should be advised of an experienced physician in the locality where he plans to be at the time he is due for a refill. The amount of air given, with opening and closing pressures of several previous refills, should be given him to aid the doctor to whom he is referred. If he contemplates going to a

high altitude, it should not be directly after a refill, but towards the middle or end of the period intervening between refills, or less pressure should be given if a trip to higher altitude is planned soon after a treatment. The patient should consult a physician earlier than usual, to check the condition of

his collapse at this lower altitude. Pressure increases at higher altitudes and if this precaution is not observed symptoms might arise from increased intra-pleural pressure. In short, individualize every patient and treat him according to his needs.

## Why the Late Entry Into the Sanatorium?

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### *Preface*

Many of the subjects dealt with in this paper are of a controversial nature. Honest differences of opinion are bound to occur. However, it is only by a frank discussion of these same problems that progress can be made.

I should like to express my appreciation in the presentation of this paper to Dr. Earl E. Carpenter and Miss Anne Durbiak.

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There is no one in the field of tuberculosis who does not realize that the greater bulk of patients coming to sanatoria enter in the later stages of the disease. This is proved by the many statistics from tuberculosis hospitals throughout America.

In the State of Wisconsin, a total of 13 sanatoria show that an average of 18 per cent enter in the minimal, whereas 82 per cent come in the moderately and far-advanced stages. Questionnaires were sent to 1,000 patients in the State of Wisconsin by Dr. Earl E. Carpenter, superintendent of the Middle River Sanatorium, and the results of the statistics thus obtained were 13 per cent minimal, 39 per cent moderately advanced and 48 per cent far advanced on admission.

Koerth et al.<sup>1</sup> state that in the Texas State Sanatorium 3.9 per cent are minimal, whereas 76.9 per cent are advanced and 16.5 per cent childhood and non-tuberculous on entrance. Data from other sanatoria corroborate this large percentage of moderately and far-advanced cases throughout this and other countries.

The obvious advantages of diagnosing the disease in incipency are

- 1) Greater possibility of cure
- 2) Smaller risk of infecting other individuals
- 3) Lower cost of effecting a cure

Our problem, briefly, in this paper is an inspection of the reasons for this appallingly late entry and how improvement can be made. Let us examine in some detail the methods of discovering tuberculosis under the present plan.

1) The patient develops symptoms, such as cough, expectoration, fatigue, loss of weight, hemoptysis, pains in the chest, et cetera. He consults his physician, who, being on the alert for pulmonary tuberculosis, proceeds to make physical and laboratory examinations. The findings being sufficient, an x-ray is taken, tuberculosis is discovered, and the patient is soon placed in a sanatorium or kept at home under the watchful eye of the physician.

2) Because of a familial history of tuberculosis and because definite contact with a tuberculous individual has been established, an examination, physical or roentgenologic, is made and the disease found, sometimes with symptoms present and sometimes when they are absent.

3) Through examination of normal individuals by insurance companies, health associations, private physicians and in pre-employment groups and school clinics, so-called "normal individuals" are found to have pulmonary tuberculosis without symptoms.

4) By large scale tuberculin testing of individuals such as school children, contacts, et cetera, x-rays made of the reactors, and

\*Middle River Sanatorium



cases of pulmonary tuberculosis are found

### *Diagnosis on Basis of Symptoms and Physical Signs*

Under our present methods, symptoms are the largest single factor in bringing the diagnosis to light. Of our 1,000 patients questioned, 43.5 per cent admitted that symptoms first brought them to the physician, but only 4.2, less than 10 per cent, entered as minimal cases. Unfortunately, 393 patients did not present any symptoms at all, apparently, until the later stages of the disease were reached. Since only 4.2 per cent of our group of 1,000 were discovered as the result of symptoms while still in the minimal stage, symptoms are, indeed, a poor aid in making early diagnosis.

Steinberg and Barnard,<sup>2</sup> of the Department of Health in the City of New York, give an illuminating study of 717 cases showing typical symptoms of pulmonary tuberculosis, such as severe fatigue, chills, loss of weight, night sweats and local symptoms, such as pain in the chest, cough and expectoration, dyspnea, et cetera. When examined by x-ray, they were neatly divided into three groups. Group number 1, 239 cases, presented no lesions at all. Group number 2, 239 cases, presented non-tuberculous lesions and group number 3, 239 cases, were definitely tuberculous. Symptoms led to a diagnosis of tuberculosis in one case out of three, although typical symptoms were present in all of them. The following table\*\* by these authors shows this comparison.

In examining 1,000 unemployed men by x-ray, Shurly and Brachman<sup>3</sup> found that 2 per cent presented symptoms suggestive of the disease and 70 per cent would have been missed had symptoms been the criteria for discovering the disease, 21 active cases of tuberculosis having been found.

Another factor in this chain of circumstances is the relative inefficiency of the physical examination in determining the presence or absence of pulmonary tuberculosis. Of the 21 cases mentioned above, 52.3 per cent showed no sign of active tuberculosis by physical examination. On our 1,000 questioned cases, 31.5 per cent had a first diagnosis other than pulmonary tuberculosis. This

was not because the physician did not recognize the disease, or was not conscientious in his examination, but occurred because the so-called characteristic signs were not present at the time of examination and the symptoms were absent or so vague as to mislead the diagnostician.

Heise<sup>4</sup> and Brown,<sup>5</sup> examining a large group of individuals, report that rales were present in the following percentages: minimal cases 27 per cent, moderately advanced 75 per cent, far advanced 90 per cent. Obviously the rale is one of the most important single physical signs which can lead us to a diagnosis of early tuberculosis. When a small part of the lung is involved, it is too much to hope that there will be any change in the fremitus and there can be little change in the resonance. The rale, however, has always been the sheet-anchor of physical diagnosis. Observe how readily one might miss a minimal case of tuberculosis by depending on this so-called infallible sign. Seventy-three per cent would be entirely missed until they have reached the far-advanced stage, where in 90 per cent of the cases rales are present and where 90 per cent of the cases also fail to get well.

McMahon and Kerper<sup>6</sup> have shown that 50

COMPARISON OF SYMPTOMS AND DIAGNOSIS  
OF 717 CASES EXAMINED IN BELLEVUE-  
YORKVILLE CHEST CONSULTATION  
CLINIC (1935)

Symptoms	No Lesions	Non-Tuberculous Lesions	Tuberculous Lesions
<i>No symptoms</i>	40	14	15
<i>General symptoms</i>			
Fever	61	67	53
Fatigue	131	140	119
Chills	51	68	40
Loss of Weight	110	121	106
Sweats	55	83	57
<i>Local symptoms</i>			
Pain in chest	68	83	72
Cough	132	195	151
Expectoration	99	180	133
Dyspnoea	44	87	65
Hemoptysis frank	6	5	25
Hemoptysis streaking	16	31	31
Gastrointestinal	7	10	5
Laryngeal	76	100	67
Sputum positive	0	0	67
Sputum negative	159	187	97
No record of sputum	80	52	75
Number of cases analyzed	239	239	239

\*Calcifications at hilum or in lungs present in 26

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per cent of the large cavities and 80 per cent of the small cavities cannot be diagnosed by physical examination because of the lack of physical findings. These can only be seen by x-rays. At Trudeau Sanatorium, in a series of 500 patients with cavities demonstrable by x-ray, only 5 per cent showed the typical signs of cavitation. All of these figures should cause us to stop and realize that by depending on the physical examination we have constructed another loop-hole whereby tuberculosis can slip through the physician's hands. The reasons for these failures in diagnosis by physical examination are many, but a few of them are given as follows:

First, certain set conditions must be present to give definite signs of cavitation. Thick fibrous walled cavities with consolidation surrounding them and with a bronchial communication usually give the typical signs so lovingly demonstrated to the physical diagnosis class. Roentgenologically young, elastic, thin-walled cavities, which are quite common, have no physical signs to demonstrate their presence, can only be diagnosed by x-ray, and have a strange tendency to appear and disappear quite rapidly.

Second, because of the crudeness of diagnosis and the localization of the lesion, it was originally thought that all involvement began at the apex, but it has been shown by Nalbaut and Pinner<sup>7</sup> in a study of 1,000 cases that incipient involvement is very much more likely to occur in the infraclavicular region than in the apical region. It is characterized by its acuteness and tendency to infiltrate rapidly, together with its tendency to excavate early. Early diagnosis in this particular type of lesion is, therefore, important as compared with apical types of involvement, which usually are slow and insidious and do not cavitate until later. However, the infraclavicular involvement, being farther away from the stethoscope, is more difficult to hear because it is surrounded by normal lung tissue overlaid with bone, and it is only with difficulty that anything but normal physical signs are elicited. Rales are also a poor criterion of determining the progress of the disease. They tend to disappear rather rapidly on bed rest. The character and number of rales does not always show the progression or the retrogression of the disease. I have in mind one young man who has had x-rays over a period

of ten years because of the presence of a large number of rales at one apex, yet activity has never been demonstrated during all of this time. It may, therefore, be said that when physical examination is negative the findings must be disregarded for other more trustworthy ones, and the efficiency of the physical examination must be considered questionable, at least in the early diagnosis of the disease.

#### *Diagnosis by Examination of Contacts*

The second method of diagnosing early tuberculosis lies in the x-raying of the contacts of tuberculous patients. By the term "contact" we refer to any individual who has been in more or less close proximity to a patient known to have tuberculosis. The longer and the more intimate the contact, the more likely it is that infection has taken place. This may be a primary infection or the reinfection type of the disease.

Dr. A. A. Pleyte<sup>30</sup> of the Wisconsin Anti-Tuberculosis Association states that in families where multiple deaths from tuberculosis have occurred, 10 per cent of the contacts are found to have reinfection tuberculosis. Families where one death has occurred reveal 4 to 5 per cent of the contacts suffering from the disease, or more than 15 times the amount of disease found in the general population. Compare this with the percentage found in high schools, for instance, in which between 1/10 and 1/3 of 1 per cent are found to have the disease, and it becomes obvious that a greater study of the contacts of known cases will yield profitable results in finding cases early.

Numerous methods are used for studying contacts. When the family physician discovers a case, he makes a determined effort to bring in the contacts and to have them x-rayed. The same procedure is also used by the sanatoria, particularly by the out-patient departments, which, after a list of contacts is made, send out an investigator to round up all of the individuals known to be contacts of the patient. In some cases tuberculin tests are made on the contacts of the patient and then positive reactors x-rayed, whereas in other places all contacts are x-rayed without regard for the tuberculin test. Should anything suspicious be noted, the individual may be permitted to enter the sanatorium for ob-

servation, or he may be allowed to go about his work, and x-rays requested at regular intervals for observation of the lesions

In a group of 1,353 children<sup>8</sup> under 15 years of age, it was revealed that in homes where sputum positive cases are found 77 per cent of the children had positive tuberculin tests, whereas, in homes where negative sputum cases were found 45 per cent of the children had positive tests

Weintraub<sup>9</sup> states that in a group of contacts studied, 26 per cent had x-ray evidence of childhood type of involvement, compared with only 10.6 per cent where no definite contact could be established. In a similar group of contacts 24 per cent had x-ray evidence of primary infection, compared with 12.2 per cent in a non-contact group

Schrempf<sup>10</sup> examined 7,214 school children by the tuberculin test in Germany. He found 1,460, or approximately 20.2 per cent with a positive reaction. In families where definite exposure to tuberculosis has taken place, 89.3 per cent were found to be positive, which gives added emphasis to the figures of Dr Pleyte, that the disease is 15 times as prevalent in a family where one death occurs from tuberculosis, as in the average family

Charles Schuman<sup>10</sup> quotes Jessel in stating that among the contacts of 1,035 sputum-positive cases, who were studied for a period of three and one-half years, 153 new cases of pulmonary tuberculosis were discovered. He also states that 205 individuals exposed to positive sputum, 49 or 23.9 per cent contracted the disease, which was contrasted with 115 contacts of negative sputum cases where only 15 or 13 per cent contracted the disease. These statistics clearly reveal a "pay dirt" of high potentialities in finding the disease. Sometimes evidence of contact cannot be established between two cases for many years, but the old slogan, "Every case of tuberculosis comes from another," cannot be questioned

Other investigators have proved definitely that the amount of infection that occurs is almost a mathematical factor of the length of time that contact was maintained. There is also a definite connection between the seriousness of the disease in the original case, when discovered, and the amount of infection which has occurred in the contact

Johnson, Howard, Smith and Douglas<sup>11</sup>

have shown that in the twelve year study of 828 children who were contacts, 22 reinfection cases were found, which is much higher than could be expected in an average group of children

Dr Plunkett states,<sup>12</sup> "The number of cases found among children under fifteen, examined because of contact or symptoms, was almost negligible. In case finding programs, therefore, greater emphasis must be placed upon securing the examination of adult contacts, even to the exclusion of children, when such a choice has to be made"

#### *Diagnosis by X-ray Surveys*

The third method of locating tuberculosis lies in the examination of large groups of normal individuals. This may be a physical examination, fluoroscopic or x-ray examination. The advocacy of yearly or semi-annual "health examinations" can be a positive factor, provided the physician does not rely on the stethoscope to diagnose pulmonary tuberculosis. Where the opportunity is present, x-rays should be taken. If this is not economically feasible, a fluoroscopic examination of the individual is essential, for if tuberculosis is present in the very early stages, it will quite often be found

Edwards<sup>13</sup> gives the results of a large number of x-rays taken on individuals desirous of working in the Department of Health, Fire and Education in the City of New York. So far as we know, all of these persons were apparently in good health. Routine x-rays were taken of prospective employees, who were nurses, physicians, dentists, clerks, laboratory workers and laborers. A total of 1,206 x-rays were taken, and 61 or 4.7 per cent were classified as chronic pulmonary tuberculosis. The average ages of these persons were 31.3 years for the male and 29.8 for the female. Inasmuch as many of these individuals were professionally concerned with public health itself, and since most of them were presumably of a fairly high order of intelligence, it seems obvious that, had symptoms been present, it would not have been necessary to take x-rays to reveal the disease

A group of 5,279 prospective firemen, all adult males averaging between 23 and 29 years of age, were x-rayed. Seventy or 1.3 per cent revealed definite chronic pulmonary tuberculosis. In the Department of Education 3,185

prospective employees were radiographed, 1,660 of whom were male and 1,523 female. Eighty-three cases or 2.6 per cent of the total group were found to have chronic pulmonary tuberculosis. In addition, 1,917 x-rays were taken on applicants who desired to become guides, and 48 cases or 2.5 per cent were found to be actively tuberculous. Considering that one undiscovered case of tuberculosis for which the municipality was responsible might cost the city thousands of dollars, it is obvious that the cost of these 11,687 x-rays is far below the cost of taking care of the 262 cases had they not been discovered prior to employment. This same factor is certainly a strong selling point, not only to various branches of the Government, but also to private industry where breakdown from tuberculosis is frequently a subject in which litigation plays a very important part. Fellows,<sup>2</sup> since 1928, has examined, fluoroscoped and, where necessary, x-rayed the Home Office employees of the Metropolitan Life Insurance Company. In the year 1932, 33 cases were admitted to their sanatorium.

#### *Diagnosis by Tuberculin Surveys*

The fourth and last method of determining the presence of tuberculosis is by the tuberculin test, and until a few years ago, few persons dared to question the veracity of such a simple and inexpensive test as the Mantoux or Von Pirquet test. However, within the last several years a number of investigators have shown that the diagnostic importance of the tuberculin test is questionable.

Long<sup>14</sup> admits that the tuberculin test may show 5 to 10 per cent error.

Dahlstrom<sup>14</sup> examined 2,490 positive reactors, revealing that 276 or 11 per cent became negative at a later period.

Knies<sup>15</sup> examined by the tuberculin test 206 individuals in whom tuberculous infection had been definitely established by x-ray. These individuals ranged in ages from 5 to 75 years, and using the first strength tuberculin he found that 114 of this group were negative. Previous to the test, considerable pressure had been brought to bear through education, interviews, etc., but of these 114 negative cases only 34 returned to take the second strength test. Twenty-one of this group were negative. In a second group of 317 cases, he found that 7 were negative, although x-rays

had revealed minimal exudative infiltration. Knies, therefore, contends that, considering the percentage of the group that failed to return for the second test—and this is a common occurrence—an error of 27 per cent might be chalked up against the test. A variant was discovered in using old tuberculin and PPD, and it was determined that old tuberculin was somewhat more sensitive than PPD, although some individuals reacted positively to one test and negatively to the other.

Crimm<sup>16</sup> reports that in 1,384 cases, 191 or 13.8 per cent reacted negatively, although there was roentgenological evidence of pulmonary tuberculosis.

As recently as January, 1941, Tice<sup>17</sup> reports that 167,345 children were tuberculin tested and that of 27,401 positive reactions only 586 active infections were found, at an estimated cost of \$450 per case. He concludes that "in view of the effort and expenditures and in the face of recent developments, case-finding limited to the school age groups is unproductive and economically contraindicated in large scale work." He apparently feels that x-ray surveys of individuals where there is a high death rate from tuberculosis is of greater value, and that the miniature x-ray will probably take the place of the tuberculin x-ray screening method.

Douglas and Birkelo<sup>18</sup> examined by miniature x-ray and tuberculin-tested 1,425 women. Five cases of tuberculosis were found in this group, 3 of whom reacted positively to the tuberculin and 2 negatively. Had the tuberculin test been used as a criterion, almost half of the cases would have been missed. Musacchio<sup>19</sup> states that in 1,000 cases of pulmonary tuberculosis, the more minimal the lesion the more positive the reaction. In 528 far-advanced cases of pulmonary tuberculosis tested with tuberculin, 17 were non-reacting, or, 78.3 per cent of this entire non-reacting group were in the far-advanced stage.

Here at the Middle River Sanatorium we have tested our patients and found that in the first strength Mantoux test 78 per cent reacted, and that of 46 non-reactors who were given the second strength test, all of the minimal cases, 75 per cent of the moderately advanced and 63.6 per cent of the far-advanced cases reacted. This shows that 36.4 per cent of our far-advanced cases did not react to the second strength tuberculin. The

test was repeated in 1940 with a somewhat higher percentage of reactors. Ten per cent of our entire far-advanced group failed to react to the test.

Robins<sup>20</sup> makes the following statement: "The pre-adolescent child is not a fertile field for case-finding by the mass survey method. A study of 9,500 children, 3 to 16 years of age, investigated by tuberculin test screening and x-ray of the positive reactors, revealed only two cases of reinfection tuberculosis." Many organizations spend a good deal of effort and money attempting to locate active tuberculosis through wholesale tuberculin testing upon thousands and thousands of school children. The positive reactors are proudly x-rayed, a few cases of childhood infection are found, a rare case of adult tuberculosis is seen and many hundreds of thousands of healed childhood tuberculous chests are noted. The next year many of these same children may be re-examined, again to find the same condition prevailing. It is economically unsound to continue this practice indefinitely. In most cases the follow-up only continues for 2 or 3 years at the most and the whole thing is then forgotten. It reminds one of the quotation from Shakespeare: "It is a tale told by an idiot, full of sound and fury, signifying nothing."

Godfrey<sup>21</sup> asserts of the promiscuous tuberculin testing of school children: "I do so only to condemn it as a waste of time, money and effort—at least until the real job has been done. Mass surveys of whatever type must be carefully considered from the standpoint of cost and probable yield. Except for exploratory purposes, they should not interfere with a thorough search among the household contacts."

The obvious disadvantages of tuberculin testing are

- 1) It is an expensive method of locating pulmonary tuberculosis, as compared with other methods of finding the disease.

- 2) It is inaccurate, as shown by the above statistics.

- 3) Many parents object to the use of needles on children, which prevents a certain number from consenting to the test.

- 4) If the first strength test has been made the news gets around that there are many sore arms and many parents refuse to have the children subjected to second strength test.

- 5) It leads to false sense of security in those in whom the test is negative. It also leads to an undue amount of alarm in positive reactors, particularly in rural communities where many children have been ostracized because the simple tuberculin test was positive.

In recent years the tuberculin patch test by Vollmer, put out in the form of an inexpensive tape containing controls as well as tuberculin, has been used in a number of different localities. Even as far back as 1933 Wolff<sup>22</sup> recommended the tape test, in which he used an ointment containing the tuberculin and the killed tubercle bacilli in a rather high concentration. The test was read in 48 hours. The positive reaction shows erythema, induration and even papules, whereas in a weak reaction a pale rose color is noted. The height of reaction was found to have occurred in 72 hours. In comparison with the intracutaneous test, he found that the two agreed in 95.8 per cent of the cases. In a later communication<sup>23</sup> Wolff et al reported that using tuberculin ointment they found an agreement of 98.2 per cent with the intracutaneous injection of 0.1 mg of old tuberculin.

Taylor,<sup>24</sup> in his report on the more modern patch test by Vollmer, states that it has been his observation that the test was actually more sensitive than the Mantoux for the young, but above 50 years it was less so. His comparison with the Mantoux reveals that they were 94.3 per cent in agreement. This test, of course, has the advantage of removing the objection of the needle, and while I have not had any positive experience with the tuberculin patch test, it is said to result in fewer sore arms. However, the other objections to tuberculin testing still hold, and it would seem that, inasmuch as there appears to be a question regarding the variation in the sensitivity of skins, the quantitative character of the Mantoux test is in no way approached by the tuberculin patch test. It would be interesting to see the result of this same test on a number of far-advanced and terminal cases of pulmonary tuberculosis.

It is true that the tuberculin test is of some educational value, but when it is considered that there are many other methods that can educate individuals with greater efficiency and less cost, I do not believe that we should hold on to a method which is obviously going to fall into greater disrepute as time goes on.

### *Possibilities and Advantages of X-ray Examination*

We have gone, in some detail, into the various methods of diagnosing pulmonary tuberculosis under our present system and we find that looking for symptoms and physical signs is a poor method of bringing our battling average up to where it should be

In minimal tuberculosis Brown and Sampson<sup>25</sup> state that the x-ray is positive in 99 per cent of the cases, a positive sputum is present in 35 per cent, physical signs (rales) in 27 per cent, history of hemoptysis in 26 per cent and a history of pleural effusion in 4 per cent of the cases. Therefore, if it were possible to x-ray every individual at regular intervals, early diagnosis could easily be made, but this has not been economically possible. It is also obvious to everyone in the field that, as time goes on and as fewer and fewer individuals are infected with the disease, more and more x-rays will be taken which will reveal only healed childhood tuberculosis or no tuberculosis at all.

It would seem, however, that x-ray examination should be of value at certain specific periods in the individuals' lives, from physical and economic standpoints. In recent years many states have passed laws requiring a Wassermann test and an examination to prove the absence of gonorrheal infection, prior to marriage. It would appear that this is the logical time to rule out tuberculosis also. The advantages of having an x-ray at this time are many, but we all know that the most susceptible period for tuberculosis is between the ages of 15 and 35 years. It is a period when mortality is at its highest. It would prevent bringing into the world many children who are destined to become orphans at an early age because one or the other of the parents suffered from an unrecognized active tuberculosis. In the interest of society as a whole, this would be an ideal period to gently coerce individuals into having x-rays before assuming the responsibility of caring for a family.

Since it is economically impossible to x-ray everyone, and x-rays must be repeated at intervals in order to be effective, other methods must be used to approach the problem. One of these methods is the fluoroscope, which has been recommended by many investigators.

Knies<sup>15</sup> contends that, whereas there is a 26 per cent error in diagnosis by the tuberculin test alone, the fluoroscope can be said to have a 97 per cent error. We previously mentioned the work of Fellows,<sup>26</sup> who by physical examination and fluoroscope was able to pick up a considerable number of minimal cases far earlier than by any other method outside of the x-ray. In 2,603 fluoroscopic examinations made, he reports that there was an error of 13 per cent by the fluoroscope when checked by the x-ray. An analysis of Fellows' cases revealed 76 per cent in the minimal stage and 24 per cent in the moderately and far-advanced stages. Compare this with statistics quoted by Steinberg and Barnard, from the Bellevue-Yorkville Consultation Clinic, in which the percentage of minimal cases is given as 26 per cent, and that of the diagnosing clinic of the Department of Health of the City of New York for 1932, where 29 per cent were found minimal. These clinics, undoubtedly of the highest type, were particularly dependent on symptoms as a method of drawing attention to the disease. Suspicious physical findings noted by the family physician also sent individuals to the clinics. It is obvious that the fluoroscope exceeds, by far, these methods in diagnosing early cases. Most tuberculosis workers agree with Anderson,<sup>25</sup> who states that 50 per cent of minimal cases have no abnormal signs and that the remaining 50 per cent have scant signs of infection.

Francisco<sup>26</sup> in 146,571 fluoroscopies done on large groups of so-called normal individuals, found in 2,004, or 1.4 per cent, evidence of pulmonary tuberculosis. It is significant that 70.2 per cent were classified as minimal.

The advantages of the fluoroscope are

- 1) Low initial cost of examination
- 2) The ability to actually visualize the lung tissue where even the x-ray does not penetrate

The fluoroscope is an inexpensive instrument, compared with the x-ray. The ability to visualize the lung is, of course, important as it has been shown many times that questionable pathology in the circle of the first rib, which is sometimes not as clear in an x-ray due to the interposing scapula, clavicle and ribs, makes the diagnosis obscure. By fluoroscoping the patient, rotating the scapula, raising or depressing the clavicle, a

clearer visualization may be obtained, which would otherwise require still more x-rays to make clear. Rotation of the patient also demonstrates presence of pathology hidden behind the cardiac shadow, and cavities are sometimes discovered in the cardio-hepatic angle.

The disadvantages of the fluoroscope are

1) The human element is predominantly important, in that the findings are the impression of one individual

2) Considerable amount of experience with the fluoroscope should be had before one can be certain of the various markings which are normally present

3) As with the x-ray, the thickness of the patient, on occasions, will make the diagnosis somewhat more difficult

4) No permanent record is kept of what was actually seen, but merely the impression of the fluoroscopist

5) There is no method of comparing serially the chest from one time to the next and small changes might be forgotten by the observer

Considering, however, the difference in error by other methods and their availability, we can heartily concur with Knies<sup>15</sup> in his statement "On the whole, in experienced hands and with adequate equipment, fluoroscopy appears to be a thorough and dependable method of radiological chest examination." Where there is any suspicion at all in the mind of the fluoroscopist, it is, of course, always better to x-ray. In our institution we have been able to pick up lesions by the fluoroscope that were less than one centimeter in diameter and where there were no physical signs or symptoms of the disease present. Fluoroscopic examination of contacts before x-raying has saved many films from needless use.

Several investigators have recommended the combined use of the fluoroscope and the x-ray, and this would appear to be a method worthy of consideration in locating early cases of pulmonary tuberculosis at a fairly low rate of cost per case. School children are first tuberculin tested, the positive reactors are fluoroscoped and x-rays are made of those who are at all suspicious. This would cut down the number of films usually used and the remainder of the program could then be carried out more inexpensively. Following the tuberculin testing of the children, it is then

recommended that in all families in which there are positive reactors the adults in contact be fluoroscoped and the suspicious cases radiographed.

Weber, Murphy and Holcomb<sup>27</sup> attempted such a procedure realizing that the x-raying of large groups of children quite often leads, in the end, to very few cases of significant pulmonary tuberculosis. In Ulster County, New York, 742 children were tuberculin tested and 238 reactors found. These individuals were x-rayed and one active case of the disease discovered (which is about the result of the average tuberculin-x-ray survey). From October, 1933, to May, 1934, they attempted to put the plan mentioned above into operation. A group of 1,362 high school students were Mantoux-tested and 32.7 per cent were positive. Of 3,596 grade school pupils tested 14.5 per cent were positive reactors. A group of 410 of the 446 positive high school reactors (92 per cent) were fluoroscoped, as well as 393 grade school pupils. Ninety-nine or 12 per cent of these 803 pupils had suspicious fluoroscopic findings and were x-rayed. The findings were as follows:

Minimal tuberculosis	4 cases
Moderately-advanced tuberculosis	3 cases
Far-advanced tuberculosis	1 case
Calcifications	19 cases
Suspicious	8 cases
Other conditions	5 cases

The parents of these positive reactors were then fluoroscoped, these being divided into two groups, viz (1) families completely examined, 217, (2) families partially examined (one adult member seen), 104 families. A total of 537 individuals were seen and fluoroscoped, sixty-four of these, or 12 per cent, being considered suspicious enough to x-ray. Including the children, a total of 1,340 individuals were fluoroscopically examined and 163 x-rays were taken. The grand results of these tests were as follows:

Minimal tuberculosis	15 cases
Moderately advanced	12 cases
Far advanced	1 case
Suspicious	15 cases
Other conditions	21 cases

The total cost in this series, not including the tuberculin, which in many cases is furnished free by the Department of Health, was



\$182 25, averaging a cost of \$6 50, which compares favorably with the \$450 00 per case mentioned by Dr Tice previously, in the old method of tuberculin-testing

Another method worthy of consideration in the roentgenological study of large groups of individuals is the paper film advocated by Dr J Arthur Myers, who has used it at the Lymanhurst Health Center in Minneapolis for the last 7 years, and who is very enthusiastic regarding its possibilities. In a personal communication to the author Dr Myers states "We did quite a large series of examinations with both paper film and celluloid film simultaneously, and were unable to find anything on the celluloid film that was not distinctly visible on paper film."

In an article by Dr Myers<sup>28</sup> entitled "Value and Limitations of X-ray in the Diagnosis of Chest Diseases," he aptly defends the paper film. Of 1,075 students examined by paper x-ray, 50 of whom were known to have definite disease of the chest, since they had had stereoscopic studies previously, not one lesion was missed by the paper film, although many of these were minimal. He argues that, whereas fluoroscopy was adequate in screening out 95 per cent of tuberculosis, it is better to use the paper x-ray, which he feels is considerably more efficient than fluoroscopy and cheaper than celluloid x-rays. He admits that small shadows have been overlooked on the paper film but this has also occurred on the celluloid film and he believes definite lesions will be visible on both the celluloid and the paper film.

The New York Health Department has examined by paper film more than 200,000 persons and is apparently quite satisfied with this method of examining.

Entering into the picture is the new method of the miniature film which is done by two different methods. One is the use of a special fluorescent screen. Opposite the screen is placed a 35-millimeter camera with a F 1.5 lens, and a small picture is taken of the screen. After developing this 1x1½-inch picture it is then projected to whatever size is desired. The other method consists of using a large lens of approximately the same capacity to make a picture of the fluoroscopic image 4x5 inches in size. This apparatus is being manufactured by the General Electric X-Ray Corporation.

Bridges,<sup>29</sup> using the 4x5 picture, shows that this method combines the advantages of the x-ray with the economy of the fluoroscope. Another important factor is the small filing space necessary. He estimated that the error in diagnosis in all types of cases of significant pulmonary tuberculosis is 0.77 of 1 per cent. This method, therefore, appears to be quite worthwhile at the present time, although it is not the last word to be said on the subject. The 35-millimeter camera method also has great possibilities and it is believed that at least one of the large x-ray companies is working on a unit employing this method.

Douglas and Birkelo<sup>18</sup> examined a large series of individuals by the 14x17 x-ray film. They discovered 271 cases of tuberculosis. This same group was re-x-rayed by the miniature film and it was found that 5 cases were missed entirely and 5 cases were called other degrees of tuberculosis than were revealed by the larger plate. The total error according to these authorities was 2.6 per cent, and they believe that with greater familiarity a smaller percentage of error will result, inasmuch as this method of diagnosing has only been on the market a relatively short time.

It has the advantage of

- 1) Speed (73 persons were examined in 65 minutes)
- 2) Cost (which is approximately 1/10 of the regular film), 10 or 11 cents per plate
- 3) Simplification of the problem of handling, filing and storing ((33 per cent of the regular space necessary for the 14x17 film))

The results of their examination of 1,425 women, who were examined by tuberculin test and by the miniature film, were given before. It is probable that this method will be used more and more in large surveys of so-called normal individuals. It is realized, of course, that, as the authors have observed, this film can never be used as a substitute for the larger size. They are, however, useful in survey work where large numbers of pictures must be taken.

### *Summary and Conclusions*

A Summing up this entire paper we may say that the methods of diagnosing tuberculosis at the present time are

- 1) The patient-physician relationship in which, because an individual suffers with symptoms, he consults a physician and is ex-

amined by him. Provided that suspicion is sufficiently aroused, an x-ray is taken.

2) The work of sanatoria and Public Health officials, Tuberculosis Associations, private physicians and local groups, among contacts. These workers realize that from 15 to 30 times as much tuberculosis is found among individuals who are in direct contact with a tuberculous person as in the general population. Examination of contacts is usually done by means of the x-ray. Some few still cling to the idea that tuberculin tests should be made first and those that are positive be x-rayed. Many authorities now agree that the x-ray is the only safe method to depend on, regardless of the tuberculin reaction, particularly in adults.

3) X-ray studies of the chests of normal individuals at various times during life, such as, before obtaining employment, at the time of marriage, before undergoing long educational careers, during the high school years and on entering and leaving college.

4) Tuberculin testing, which is responsible for approximately 5 to 10 per cent of the cases in sanatoria being brought to light.

B We have shown the relative inefficiency of the physical examination and of symptoms in either leading us to the diagnosis or in clinching the diagnosis. *Where the findings are negative, little or no reliance can be placed upon either of these factors.*

C The expensive and questionable wholesale tuberculin-testing of school children, with subsequent x-raying, without adequate investigation of the contacts which these children make, is to be looked upon as digging for lead when gold lies on top of the ground.

D The 99 per cent efficiency in minimal cases and the almost 100 per cent efficiency in moderately and far-advanced cases, make the x-ray the chief instrument of diagnosis. We realize that the practical disadvantage of high cost prohibits large scale application to the point where it is an efficient weapon in locating the disease. From the public health standpoint, consideration should be given to the combination of tuberculin testing the children and their contacts, together with the x-raying of those whose chests appear suspicious of active infection by fluoroscope.

Lastly, the more widespread the use of the x-ray is made economically possible by means of the paper film and miniature celluloid

film.

In conclusion, as Dr J Arthur Myers has stated so ably, "Therefore, in arriving at final diagnoses of diseases of the chest, we must constantly keep in mind that no single phase of the examination is adequate. While the x-ray is of great value in locating lesions, it remains just one part of an examination of which there are many important parts. The final diagnosis in many cases is reached only when one has brought together *all* available evidence so that the clinical picture of the disease is complete." It is obvious that no one test or group of tests now available can make the diagnosis 100 per cent certain. Until such a time arrives that a test is devised which is 100 per cent infallible, every factor must be considered as a facet in the jewel which makes the diagnosis. Until more skepticism is evinced toward negative findings of the physical examination and the tuberculin test, and greater reliance is placed upon the fluoroscope, the miniature x-ray films and the standard x-ray, there will be little change in the dark picture of late cases entering the sanatorium.

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## Organization News

### SECOND ANNUAL MEETING PENNSYLVANIA CHAPTER

The Pennsylvania Chapter of the College will meet at the Wm Penn Hotel Pittsburgh, on October 4 and 5, 1942 The following program has been arranged

*Sunday October 4th*  
5 00 P M

General business—Committee reports

Election of Officers

6 30 P M

Social Hour—Beverages

7 00 P M

Banquet (informal)

Guest Speaker

Dr J Winthrop Peabody

President of the American College of Chest Physicians

### SCIENTIFIC MEETING

*Monday, October 5th*

9 30 A M

Management of Pulmonary Tuberculosis in the Rejected Draftee

Dr C Howard Marcy, Pittsburgh, Pa

Discussion

Dr Nelson Mercer, Philadelphia, Pa

10 15 A M

The Role of Fluoroscopic Guidance in the Diagnosis and Treatment of Thoracic Diseases

Dr Louis Cohen, Philadelphia, Pa

Discussion

Dr V Leffingwell, Sharon, Pa

11 00 A M

Information Please—Pulmonary Tuberculosis

Your questions will be answered

12 00 Noon

Luncheon

The officers of the Pennsylvania Chapter are R S Anderson, M.D., Erle, *President*, Harry J Treshler, M.D., Cresson, *Vice-President*, Edward Lebovitz M.D Pittsburgh *Secretary-Treasurer*

### PRESIDENT-ELECT HONORED

The Illinois Chapter of the American College of Chest Physicians sponsored a dinner in honor of Dr Jay Arthur Myers, Minneapolis President-Elect of the College The dinner was held at the Edgewater Beach Hotel Chicago, September 16 Forty-two members of the College from the Mississippi Valley states attended the dinner

Dr Robert K Campbell, Governor of the College for Illinois, presided and introduced the following officials of the College, who made brief talks

Dr Fred M. Melxner, Peoria former Regent and President of the Illinois Tuberculosis Association,

Dr Merlin H Draper, Fort Wayne Indiana, President, Indiana Chapter,

Dr James H Stygall, Indianapolis, Regent for the District,

Dr G Arvid Hedberg, Nopeming, Governor for Minnesota,

Dr Sidney A Slater, Worthington, former Governor for Minnesota,

Dr Carl O Schaefer, Racine, Governor for Wisconsin

Dr Joseph C Placak, Chairman of the Board of Regents of the College, spoke on the progress the College had made and he placed emphasis on the large number of members who are serving with the Armed Forces of our country

Dr Jay Arthur Myers gave an interesting talk which has been condensed and is published in this issue of the Journal as an editorial

Dr Otto C Schlack Oak Forest, Illinois was Chairman of the Reception Committee and he introduced Dr Hugh A Beam, President of the Illinois Chapter of the College, who turned the meeting over to Dr Campbell, the Toastmaster

### NEWSNOTE

Dr Joseph E J Harris, Albuquerque New Mexico, a Fellow of the College was chosen President-Elect of the New Mexico Medical Society at their annual meeting in June

## MICHIGAN CHAPTER MEETS

The Fall meeting of the Michigan Chapter of the American College of Chest Physicians was held at the Pantlind Hotel, Grand Rapids, September 22, 1942. The following program was presented

## AFTERNOON SESSION

2 30 P M

Norman Clarke, M.D., *Presiding*

End Results in 100 Pneumothorax Cases

Paul Chapman, M.D.

Bronchoscopic Examination as an Aid in the Early Diagnosis of Cancer of the Lung

John R. Burch, M.D.

Diagnostic Importance of Pleural Effusions in Cancer of the Lung

William P. Chester, M.D.

Cardio Pulmonary Disease

Leslie F. Colvin, M.D.

6 30 P M

## DINNER MEETING

(Informal)

William A. Hudson, M.D., *Master of Ceremonies*

Physiology of Respiration

Kenneth A. Wood, M.D.

General Discussion of Thoracic Trauma

Jerome R. Head, M.D., Chicago, Illinois

The officers of the Michigan Chapter are: Willard B. Howes, M.D., *President*, Stephen M. Gellenger, M.D., *Vice-President*, Donald F. MacInnis, M.D., *Secretary-Treasurer*

## NEW JERSEY CHAPTER MEETS

The Fall meeting of the New Jersey Chapter of the American College of Chest Physicians was held at the Bergen Pines Sanatorium, Ridgewood, New Jersey, September 25, 1942, at 2 00 P M. The following program was presented

Dr. Joseph R. Morrow, President, New Jersey Chapter, *Presiding*

Address of Welcome

Dr. George M. Levitas, Member, Board of Managers, Bergen Pines

Aims of the American College of Chest Physicians

Dr. J. Winthrop Peabody, President, American College of Chest Physicians

Medical Military Objectives

Lieut.-Col. Esmond R. Long, Office of the Surgeon General, U. S. Army, Washington, D. C.

Symposium

Dr. J. Edward Bennett, Attending Roentgenologist, Bergen Pines, New Jersey

The officers of the New Jersey Chapter are: Dr. Joseph R. Morrow, *President*, Dr. Clyde M. Fish, *Vice-President*, Dr. Irving Willner, *Secretary-Treasurer*

## INDIANA CHAPTER MEETS

The annual meeting of the Indiana Chapter of the American College of Chest Physicians was held in conjunction with the meeting of the Indiana State Medical Society at French Lick, Indiana, September 29. The meeting was held jointly with the members of the state and county anti-tuberculosis committees of the Indiana State Medical Association and the following program was presented by the Indiana Chapter of the College

## Luncheon Meeting

Pitfalls in Pneumothorax Treatments

Dr. Paul A. Turner, Louisville, Kentucky, Superintendent, State Sanatorium

Reinfection Tuberculosis in Younger Children  
Dr. James H. Stygal, Indianapolis

Results of Pectin-Agar Feeding in Gastro-Intestinal Tuberculosis

Dr. Paul D. Crimm, Evansville

X-Ray Conference

Dr. J. V. Pace, New Albany, Chairman

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Dr. Samuel Libanio, Botafogo, Rio de Janeiro, D. F.  
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Dr. Luis Arantes de Almeida, Rio de Janeiro, D. F.  
Dr. Alfonso MacDowell Filho, Rio de Janeiro, D. F.

Dr. MacDowell has notified the Executive Offices of the College that a Chapter of the American College of Chest Physicians will be organized in Brazil. The officers of the Chapter will be announced in a future issue of the journal.

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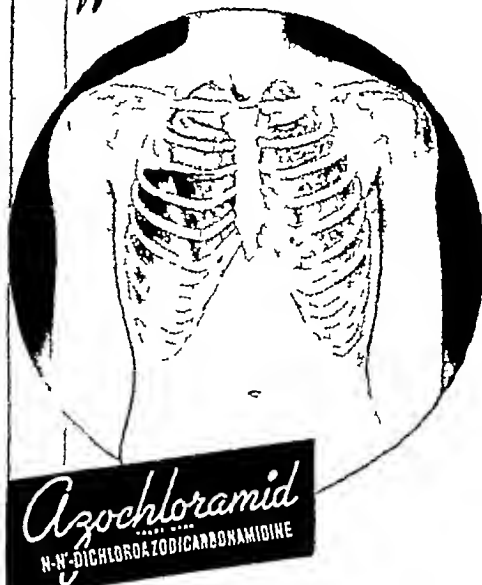
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## OBITUARY

## JULIUS PETER DWORETZKY

1885-1942

Dr Dworetzky was born in Lida, Russia December 24 1885, and died in Liberty New York, April 20, 1942. He was graduated in medicine from the Long Island College Hospital in 1940 and was a Fellow of the American College of Chest Physicians.

Dr Dworetzky was director of medicine at the Municipal Sanatorium at Otisville consulting physician to the Elizabeth A Horton Memorial Hospital at Middletown, St. Clare's Hospital in New York City, St. Francis Hospital at Port Jervis, Ulster County Tuberculosis Hospital at Kingston, and medical examiner to the Veterans Bureau. He was a Fellow of the American Medical Association, a diplomate of the American Board of Internal Medicine, a diplomate of the American Board of Otolaryngology and a member of the American Laryngological, Rhinological and Otolological Society, and the state and county medical societies.

During the world war I Dr Dworetzky served in France as a Captain of the American Red Cross with the Rockefeller Tuberculosis Commission.

Dr Dworetzky made several original contributions to literature in the field of tuberculosis of the larynx.

Jas S Edlin, M D

New York N Y

## ERRATUM

Dr Frank G Seligson, formerly of Glenclyff New Hampshire, a Fellow of the College, has been appointed medical superintendent of the Edward Sanatorium Naperville Illinois. This is to correct a notice which formerly appeared in the journal.

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# DISEASES *of the* CHEST

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## CONTENTS:

PRESIDENT'S ADDRESS (Page 262)

J Winthrop Peabody, M.D., F.A.C.P. Washington, D. C.

AMBULATORY ARTIFICIAL PNEUMOTHORAX  
TREATMENT IN PUERTO RICO (Page 265)

David E. Garcia, M.D. Hato Rey, Puerto Rico

TUBERCULOSIS CONTROL (Page 269)

James W. W. Dimon, M.D. Utica, New York

PERCUSSION OF THE CLAVICLE (Page 273)

F. S. Miller, M.D. Spokane, Washington

MEETING OF THE COUNCIL ON UNDERGRADUATE  
MEDICAL EDUCATION (Page 276)

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\*NARODICK, P. H. (Supt. and Med. Director, King County Tuberculosis Hosp., Seattle, Wash.) Northwest Med. 41:195 (June) 1942.

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OF THE

# CHEST

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## Editorial Comment

**A New Format** In accordance with a resolution adopted by the Board of Regents of the American College of Chest Physicians, *Diseases of the Chest* will change its format to comply with the style used by most of the medical specialty journals published in this country. This change will become effective with the January, 1943, issue of the journal.

The number of pages will be materially increased and a greater number of illustrations will be published in connection with the scientific articles which are to appear in the journal.

In accord with a popular demand by the 1200 members of the College, only the highest type of scientific papers dealing with the subject of diseases of the chest will be accepted for publication. While papers dealing with tuberculosis will receive a prominent place in the journal, an increased amount of space will be given to papers concerning non-tuberculous chest conditions.

A section of the journal will be given over to abstracts of articles from this and other countries dealing with diseases of the chest. Another section of the journal will contain book reviews and reviews of current literature. A greater amount of space will be accorded to organization news and to the activities of the members of the College.

Summaries of the papers published in the journal will be translated into the Spanish language and printed at the end of each article. The activities of our members in the Pan-American countries will receive a prominent place in the organization news columns of the journal.

Proceedings of the annual meetings of the College will be published in the journal and the activities of state and district chapters of the College will receive greater prominence in the enlarged publication.

A special section of the journal will be concerned with military medicine as it applies to diseases of the chest. This section will be supervised by the Council on Military Affairs of the College, and the latest information on military medicine will be published as soon as it is available. Members of the College who are serving in the armed

forces of our country will receive special mention in the journal and an up-to-date directory of these members will be published whenever it is compatible to the best interests of our country that we do so.

Articles dealing with undergraduate and postgraduate teaching of diseases of the chest will be featured from time to time by the Councils on Undergraduate and Postgraduate Medical Education of the College.

Symposia dealing with timely subjects concerned with diseases of the chest will appear in special issues of the journal. The January, 1943, issue, which is to be the first issue of this revised journal, will contain a "Symposium on Bronchiectasis." This issue is being compiled under the direction of Dr Paul H. Hoisinger, Chicago, and the following papers will be published in this special issue of the journal:

"Bronchiectasis as a Pediatrician Sees It"

Joseph Brennemann, M.D., Los Angeles, Calif

"Bronchoscopy in Bronchiectasis"

Louis H. Cierf, M.D., Philadelphia, Pa

"Otolaryngological Aspects of Bronchiectasis"

Francis L. Lederer, M.D., Chicago, Ill

"Roentgen Aspects of Bronchiectasis"

William E. Anspach, M.D., Chicago, Ill

"Surgical Aspects of Bronchiectasis"

Alton A. Ochsner, M.D., and Michael DeBakey, M.D., New Orleans, Louisiana

"Medical and Pathological Aspects of Bronchiectasis"

H. M. Riggins, M.D., New York, N. Y.

The Editorial Board of *Diseases of the Chest* welcomes suggestions from the members of the College and from the other readers of the journal. With your assistance and cooperation we will try and give you the type of journal you expect to receive and read.

R. C. M.

## President's Address\*

J WINTHROP PEABODY, M.D., F.A.C.P.  
*Washington, D C*



Fellows of the College, Ladies and Gentlemen If democracy is to survive the present crisis of total warfare in which virtually the entire civilized world is engaged, it is incumbent upon each of us to assume his separate share in the united endeavor to insure the perpetuation of the fundamental principles of individualism which our own particular form of government so admirably exemplifies, as opposed to the totalitarianism of dictators. The era of peace which is to succeed the conflict between these irreconcilable political philosophies will inevitably impose added duties and obligations to others as well as to ourselves which will necessarily have to be accepted and discharged under radically altered conditions. Accordingly, the

purpose of this address is to define the attitude of the College toward the current exigencies created by the emergency, and to indicate its policy with respect to the reciprocal relations established in consequence of the spirit of amity among allied nations engendered by participation in a common cause.

Since it is now universally recognized that the effort to win the war is of paramount importance and transcends every other consideration, the College pledges its wholehearted cooperation as an organization with the military and naval authorities in all matters involving the defense of our country and the welfare of its armed forces on land and sea. As part of its program in this connection, the College is prepared (1) To supply from its roster of members the names and professional qualifications of physicians competent to act as officers in the respective medical corps of the several branches, and to aid in the procurement and subsequent assignment of these physicians for service either with armed forces or civilian populations (2) To collaborate with medical officers of the army and navy in the examination of recruits, with particular reference to radiography of the chest, and with public health officials in the rehabilitation of applicants rejected on account of the condition of their chest (3) To render all possible assistance to those of its members who are already enrolled in the armed services (4) To foster and maintain the highest of standards for the practice of the specialty of diseases of the chest among civilian populations and in the armed forces of our country. In this respect the College has established for the first time an examining board, the function of which will be to examine all candidates for fellowship.

Obviously there are many medical problems whose solution must perforce be deferred until the end of the war, primarily for the reason that the data essential for their elucidation are still unavailable, and probably will remain so long after the cessation of hostilities. However, it is believed that tuberculosis

\*Presented before the Eighth Annual Meeting of the American College of Chest Physicians, Atlantic City, N J, June 6, 1942

can safely be excluded from this category. Our vastly superior knowledge of that disease as compared to other affections should of itself alone warrant the exception. Furthermore, our experience with tuberculosis during and since the first World War should afford valuable criteria in the establishment of a rational procedure for the systematic elimination of prospective inductees who reveal evidence of disease of the chest which might be aggravated by military service, and ultimately entail partial or total physical disability with a claim for compensation.

Infection and environment represent two cardinal factors in the occurrence of tuberculosis. Hitherto the tendency has been to regard these factors as separate and distinct, but of late it has become increasingly apparent that they should be considered together. Indeed, infection itself is quite definitely an environmental factor, and if it be present, then the other environmental factors, including poverty, overcrowding in unsanitary habitations, and malnutrition, must be corrected or controlled in order to avoid wholesale infection of a group or a community. Moreover, among predisposing influences particular emphasis should be laid also upon the abnormal conditions of existence and of labor which prevail in wartime.

Mass radiology of employees in factories where a greatly increased personnel incident to the war had occasioned extreme congestion has been advocated and practiced abroad, notably in Great Britain, and might well be instituted by large employers of labor in our own country. The significance of this innovation will be realized when it is recalled that the majority of the individuals so examined were either in their teens or their early twenties, ages at which the incidence of tuberculosis is relatively high. Another marked advantage of the procedure in question consists in the opportunity for the discovery of patients in the incipient stage of the disease, before they have been permitted to become a source of infection to those around them.

Non-industrial civilian hazards involved in the lack of food, close contact for protracted periods in dark, badly ventilated bombproof shelters, enforced migration, and other similar vicissitudes of war, all render their victims more susceptible to tuberculous infection.

Therefore may we repeat that while our primary objective is to do our part to win the war by the conservation of the health and efficiency of our armed forces, our grave responsibility toward the noncombatant population should meanwhile not be ignored. Actually there is more than ever before an urgent need for a carefully planned and intelligently conducted campaign for the detection of tuberculosis, especially among young persons still at school or about to enter industry or the public or national services of our country.

As its own particular contribution to this campaign, during the forthcoming year the College proposes to continue with undiminished energy the important work thus far accomplished under the able leadership of Doctor Edward William Hayes for the education of undergraduates in the subject of diseases of the chest. Postgraduate instruction will be imparted through the medium of the annual meetings of the College and the meetings of its district and state chapters. Scientific programs of a high character will be offered at all these assemblies. For instance, this year a joint session will be held with the American Broncho-Esophagological Association. The College hopes to arrange joint sessions with other groups associated with our specialty and other related intrathoracic conditions.

Within the past year a number of new state and district chapters of the College have been organized and established. It is our intention to complete the organization of chapters in those states and districts in which there are a sufficient number of individuals eligible for membership to form chapters. A plan to provide for the interchange of delegates between the several chapters of the College is under consideration. A special section of our annual program is to be assigned to past and present officers of state and district chapters for the exchange of ideas and suggestions likely to prove of assistance to members of all the chapters.

The promotion of the activities of the National Council of Committees on Tuberculosis will also be continued during the present year. Reports reveal the fact that committees which represent state and in many instances county medical societies have already been formed in no less than thirty-five states. The

Council is resolved to encourage the organization of committees on tuberculosis in those states which have not as yet appointed such committees, and to induce other states to establish committees on tuberculosis in their county medical societies. The Council will likewise sponsor a uniform method of procedure for utilization in the prevention and treatment of tuberculosis by each of the state and county committees where applicable. The members of these committees on tuberculosis will be invited to attend the state and district meetings as well as the annual meeting of the College, in order that a larger number of physicians may be included in our educational program.

At this annual meeting we have adopted a new constitution and set of by-laws, which were drafted by members of the committee appointed for the purpose, with the aid and counsel of qualified legal authorities, and Doctor Paul Henry Holinger as its chairman. The College will be incorporated in the State of Illinois. We are confident that the care and labor expended in their formulation have resulted in a constitution and by-laws which will serve the requirements of our organization in perpetuity without the necessity for subsequent amendment or other modification.

Under the distinguished chief editorship of Doctor Ralph Matson, our official journal entitled *Diseases of the Chest* has attained new heights of literary eminence in respect to the type of the contributions which appear in its columns. It is contemplated to increase materially the number of pages in the journal, and the same standard of excellence will be maintained in the future issues. It is expected that less stress will be laid upon elementary aspects, such as early diagnosis, and added attention will be accorded to advanced phases of the subject. Plans for this enlarged journal are now being studied by the editorial board of the College.

The publication of our annual directory of fellows and associates of the College has been postponed until after the close of the present meeting, in order that the information which it contains will be the more comprehensive and thus better serve the convenience and interests of our members. This practice will be followed in future years, so that all additions and corrections necessitated

by changes which may occur in the course of annual meetings will appear in the respective issues of the directory.

The portion of our general program as an organization which is concerned with our relationship to colleagues in other countries will be greatly expanded. Through the Council on Pan-American Affairs the efforts already inaugurated will be continued unrelentingly until every republic of Central and South America in which a sufficient number of members can be enrolled is adequately represented. It is planned to associate the smaller republics together in a closely organized unit, in order that they may in turn participate from time to time in a unified symposium on diseases of the chest. Forms of application for membership in Spanish and Portuguese will be printed and supplied to prospective members in Latin America. As previously advised, the editorial board has under consideration the enlargement of our journal. When this is done we shall be in a position to abstract the papers into the Spanish language for the benefit of our members in the Spanish-speaking countries. In the Dominion of Canada the campaign for membership so effectively instituted by Doctor William Edward Ogden, Governor of the College for Canada, will be prosecuted with renewed vigor.

In conclusion a brief commentary upon the role of the organized medical profession in our program of national defense appears appropriate on this occasion. Although doctors are as profoundly affected by war as are other members of the community, they are, in virtue of the lofty ethics of their chosen vocation and the highly altruistic impulses which actuate them, far aloof from the din and tumult of battle. Again, while they share intimately in the patriotism of their neighbors, as nonbelligerent practitioners of the healing art they are quite unmindful of race and political creed, of friend and enemy. None the less, in the face of the challenge thrown down by despots, it is the solemn obligation of every medical man among us to ascertain without delay where he can serve his country most effectively in its hour of peril.

It has been estimated that more than thirty thousand doctors will be required eventually in military camps and combat zones. This

tentative figure is based upon the experience of the first World War. At present the most urgent demand is for properly qualified men preferably still under thirty-six years of age, who are intended to serve with armed forces either here or abroad. For such physicians who are able and willing to accept service with the army or the navy the federal government has established a bureau of procurement and assignment to which applications should be addressed by them directly or through their respective local medical societies. A questionnaire especially designed for the use of applicants has already been published in the majority of our state and national medical journals.

Though doctors aged between thirty-seven and sixty years may likewise register with the same agency for military or naval duty, and will if there is a definite need for their services be tendered commissions, the general consensus of opinion is that they can render greater service as civilians in their own communities. The health of the inhabitants of agricultural regions must be conserved if the nation is to be fed. In these areas the quota of physicians is already much too low for adequate medical care. Guns, ships, tanks, and airplanes must be produced by workers in factories and plants who will be required to toil for longer hours and on extra days. It is equally essential that the efforts of these workmen should not be im-

peded by poor physical condition, hence additional medical attention will be necessary in order to keep them fit.

Physicians who are for one reason or another unselected for service with the army or navy should seek diligently for opportunities for the exercise of their abilities elsewhere. Medical education should not be permitted to suffer because of a lack of instructors, or patients in hospitals at home from depleted medical and surgical staffs. Families and practices of colleagues who have been called to the colors must receive well deserved consideration and care.

Let us remember always that the health of its people is the most valuable asset of a nation. For centuries, in war as in peace, this precious possession has reposed securely in the loyal custody of the members of our honorable craft, and never have they proved unfaithful to the trust. During the dark days which confront us, may the brilliant precedent afforded by those of our professional brethren who elected voluntarily, nay even gladly, to incur the arduous hazards and heroic sacrifices imposed upon them by hostilities of a magnitude hitherto unparalleled in human history, enable us to realize more clearly than ever before with Idomeneus that—

"A wise physician, skill'd our wounds to heal,  
Is more than armies to the public weal."

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## Ambulatory Artificial Pneumothorax Treatment in Puerto Rico

DAVID E. GARCIA, M.D.  
*Hato Rey, Puerto Rico*

Puerto Rico is a small tropical island of approximately 3,400 square miles and a population of a little over 1,800,000 inhabitants. This population consists mainly of Spaniards and their descendants, continental Americans and negroes. The population per square mile is 529 inhabitants, that is, about twelve times that of the United States of America. Of this entire population about 67 per cent live in the country and the other 33 per cent in towns.<sup>1</sup> Not only is the island overpopulated, but the homes are overcrowded, there is an average of 2.6 persons per room in towns, and

in the country the average number is 3.6.

Side by side with this problem of overpopulation, Puerto Rico has another problem even more serious, which I am sure is the root of all our evils. The wretched economic condition of the island is beyond anybody's expectation. According to the report written by Mountain, Pennel and Flock<sup>2</sup> of the staff of the United States Public Health Service pertaining to 6,000 families of all groups of this island, 60 per cent of all these families had an annual income of less than \$500 and only 4 per cent had an annual income of



\$1,000 or more

Miguel Guerra-Mondragon, LL.B., in an address made at the annual meeting of the Puerto Rico Medical Association in December, 1938,<sup>3</sup> stated that at that time there were 319,915 families in Puerto Rico. He stated further that 54.7 per cent of these families have only one sleeping room, 28.9 per cent have two sleeping rooms, and 16.4 per cent have three or more sleeping rooms. He said also that the average laborer was making from \$135 to \$169 per year. With this annual income it is impossible for them to have enough to eat, not only in quantity but in quality. The diet of the average Puerto Rican, especially of the low income class, is very deficient and completely unbalanced. So, the first stronghold of our health, i.e., the body resistance, is undermined.

The above statements give you a bird's-eye view of the economic condition of this island. Such poverty has inevitable deleterious effects on the general health and creates vast problems in sanitation.

The tuberculosis problem is likewise influenced by such undesirable circumstances. Those working in tuberculosis in Puerto Rico for some years have observed that the forms predominating are the chronic forms and not the acute as has been stated by some continental authors who judge our tuberculosis from their findings in Harlem. It is not because we doubt their findings that we disagree, but we are almost sure that the conditions under which Puerto Ricans live in those parts of the United States where they have severe winters, living usually with no relatives, and possibly in economic circumstances even worse than those found in our island, greatly influence statistics on tuberculosis occurring in Puerto Ricans there.

The magnitude of the tuberculosis problem here can be judged from the following table taken from the report by Dr. Garrido Morales and Dr. Rodriguez Pastor, Commissioner of Health and head of the Tuberculosis Department of Puerto Rico, respectively.<sup>4</sup>

It is an accepted principle today that for each tuberculosis death there should be at least one hospital bed, and that for each tuberculosis patient that dies there are around ten cases of active tuberculosis. Taking any year in the above table one can see that Puerto Rico needs at least 4,500 tuberculosis beds,

Year	Tuberculosis Deaths	Tuberculosis Death Rates
1930	4080	263.2
1931	4338	275.5
1932	4755	297.3
1933	5476	337.2
1934	5082	308.3
1935	5094	304.5
1936	5182	305.3
1937	5091	287.1
1938	4954	274.5
1939	4747	258.4
1940	4886	260.9

also that there are around 45,000 active tuberculosis cases and about an equal number of inactive cases.

Facing this titanic problem, there was, prior to 1935, one tuberculosis hospital of around 400 beds at Rio Piedras. An energetic campaign was initiated in 1935 and with the help of federal agencies and by the operation of a lottery one step further was advanced. Yet the means at our disposal were even then very limited. Before the campaign the total number of beds, *including private institutions*, was a little over 500. This was increased to 1,400 charity beds plus around 160 beds in private institutions. A lottery to be played every ten days in the island of Puerto Rico was established. By law it was specified that 50 per cent of the income derived by the government from this lottery would be employed to combat the white plague. This amounts to \$502,050 per year.

It has been calculated that a case of tuberculosis hospitalized in a charity hospital costs the government in Puerto Rico an average of \$323 per year, or around \$25.25 per month. This is very reasonable compared with the cost of care in the United States of America.

The annual budget of the Department of Sanitation in this island is \$2,299,727.12. Of this sum, \$178,205.50 is dedicated to combat the white plague. A program providing for 4,500 beds for tuberculosis would cost the government around \$1,453,000, calculating on a basis of \$323 per year (actually, the cost would probably be less because of lower overhead expense), without counting the initial investment for buildings and equipment. This would be more than half the entire budget of the Department of Sanitation. It is obvious that the Department of Health could not afford

such a program with the funds available

Yet, something had to be done. The waiting list for hospital beds was so large that sometimes a bed was occupied within a few hours after its previous occupant had left it. On some occasions, when the bed was ready the applicant next on the list was dead already.<sup>5</sup> In order to reduce the number of contagious cases as rapidly as possible with only 1,500 beds available, it was thought that a mass attack on the disease could be undertaken by the institution of ambulatory treatment of the cases by artificial pneumothorax.

In 1935 ambulatory artificial pneumothorax was started on 74 cases. This number has risen to 5,848 in the year 1940-41. The average cost per year of an ambulatory case successfully treated by pneumothorax has been estimated by the Department of Health to be \$84. The average cost of a case hospitalized, as we said above, is \$323, approximately four times that of the average ambulatory pneumothorax case. Roughly speaking, the Department of Sanitation would have spent \$1,900,000 during one year to care for those 5,848 patients had they been hospitalized. Instead, it has spent approximately \$493,332 in the same period of time for their ambulatory treatment.

Out of 5,562 patients whom Doctors Morales and Pastor<sup>4</sup> reported treated by this method, 12 per cent were minimal cases of pulmonary tuberculosis, 21 per cent were moderately advanced and 67 per cent were far advanced. From the same report I am copying the table of sputum conversions. It is shown that in the year 1940, 66 per cent of those under ambulatory care had a negative sputum. This means that several thousands of persons were protected from infection by the elimination of so many bacilliferous cases.

The plan has been carried out by means of tuberculosis centers and subcenters distributed throughout the island and located in or near towns with the highest tuberculosis mortalities. Sometimes one doctor has to attend two or three centers. There are also ambulatory x-ray units which visit the centers periodically for x-ray work.

A new case is initiated in one of these centers or subcenters. He waits there around one-half hour after the insufflation, after which time he is allowed to go home and is instructed to report at the center for the

next refill at a specified date. The case is watched by the doctor with the local x-ray or the visiting ambulatory x-ray unit. Sputum examinations are done periodically. The treatments are continued until the case is considered arrested, after which he is instructed to report for successive check-ups.

To help in this work, the Department of Health has four tuberculosis hospitals, the main one at Rio Piedras with a capacity of 800 beds, and one each at Mayaguez, Ponce and Guayama with a capacity of 200 beds each. If the pneumothorax is not satisfactory, after discussion with the head of that service the case is sent to the Rio Piedras Sanatorium, which has been left almost exclusively for surgical cases. Any operation and all the operations needed are performed. There the case is hospitalized until he can be taken care of again by the tuberculosis center. Many of the patients have to be hospitalized at some time of their treatment, some for closed pneumonolysis and others for thoracoplasty. Still, the duration of hospitalization ranged from 6 to 7 months, which is considerably shorter than their previous average period of hospitalization of several years.

The cases are not only treated at the centers, but they are visited periodically by nurses and social workers who are associated with the tuberculosis centers. The workers investigate the conditions at home, give instruction to the family about the precautions to be taken, and bring the contacts to be examined and x-rayed at the treatment centers. They also find out why some patients do not return for treatment, helping if possible with bus fare and lunch when the economic condition of the case requires such a step. This aid is obtained chiefly from local societies to combat tuberculosis.

By the operation of such a plan a very large group of cases which could not be hospitalized because of the bed shortage is receiving a form of therapy which helps them considerably. Many times the patients are able to resume work before expected, thus saving lives which are still very useful to their families. Besides, the number of contacts will undoubtedly be considerably diminished after a sufficient length of time has elapsed, as a consequence of conversion of the sputum in many of the cases. By this plan, too, the government has been able to attack in mass a prob-

lem which, due to the economic condition of the island, was thought to be almost impossible to handle

On the other hand, the plan is not without disadvantages or difficulties. It should be made clear that the Department of Sanitation had to overcome serious handicaps. Most important of them were the training of a group of physicians in the application of pneumothorax, x-ray and fluoroscopic interpretation. Nurses and other assistants likewise had to be trained. This service will be better every year but the training of adequate personnel must continue.

Complications from this large scale ambulatory treatment were expected by most of us to be rather high. There is no denying that they have had accidents. Anybody working in tuberculosis long enough is going to have accidents sooner or later.

In 296,915 insufflations the number of accidents occurring was 126, of which 15 were fatal. The number of patients concerned is not stated, but I consider the number of accidents small, especially if we keep in mind the difficult working conditions. Effusion and empyema were complications in 17 per cent of the minimal cases, 26 per cent of the moderately advanced and 35 per cent of the far advanced. I believe these figures are low, especially for the moderately advanced and far advanced groups, but even if higher, they would not be worse than the average.

It is obvious that some cases develop complications that can be better handled in a hospital, and in the event of such complications the patients are hospitalized. It may happen that for one reason or another some cases cannot be hospitalized, yet the great majority of them is given adequate treatment.

A program of mass treatment such as this

is especially helpful in the education of the lower classes, bringing them in contact with persons trained in this field. The public is becoming aware of the great danger of tuberculosis. They may still be afraid and anxious when the first symptoms of the disease appear but they are beginning to understand that the only hope of recovery lies in the proper and timely treatment. They are not afraid as they used to be of pneumothorax, a pneumonolysis or a thoracoplasty. The public is gaining faith in the present forms of treatment of pulmonary tuberculosis, and is cooperating.

We do not try to prove in this paper that ambulatory artificial pneumothorax is the real solution of the tuberculosis problem anywhere. We just want to show some of the results obtained by the Department of Health of Puerto Rico which we believe really have some value, especially for communities with social and economic conditions similar to those of this island. They can benefit from our experience in their attempt to solve their own problem of pulmonary tuberculosis.

It should be made clear again that it is preferable to hospitalize all bacilliferous cases for proper treatment, at least until they are no longer contagious, but in poor communities with low hospitalizing capacity the ambulatory form of treatment as proved by the work in this island is highly successful.

In conclusion, we believe that the real effects of this program will not be noticed until several more years have elapsed, that is, until a larger percentage of the active cases of tuberculosis come under treatment. Of course, we do not expect that all of them will be treated by pneumothorax, but when these cases can be adequately controlled, especially the bacilliferous ones, the percentage of mortality will decrease substantially. It is to be

#### 4,888 POSITIVE SPUTUM CASES

	<i>Total</i>	<i>Sputum Converted</i>	<i>Sputum Remained Positive</i>	<i>Per Cent Converted</i>
Total treated with positive sputum	4,888	2,151	2,737	44%
Treated 1 month and less than 3 months	972	149	823	15%
Treated 3 months to one year	2,004	734	1,270	37%
Treated over 1 year	1,912	1,268	644	66%

hoped that with the steady increase in the number of cases receiving ambulatory pneumothorax a definite decrease in the bacilliferous cases will occur. This drop is going to become evident in a few years, with a real drop in the mortality rate of tuberculosis in Puerto Rico.

### References

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4 E. Garrido Morales, M.D., and J. Rodríguez Pastor, M.D. Boletín de la Asociación Médica de Puerto Rico. Abril 1941, No 4, páginas 130-136

5 L. Gaetán Roberts, Director Insular Sanatorium. Personal Communication

## Tuberculosis Control

JAMES W. W. DIMON, M.D.  
Utica, New York

About twenty five years ago, when I was still young in the practice of medicine, I had the dramatic experience of seeing a case of old-fashioned galloping consumption develop in my own house and progress to a fatal termination in a few months. With the realization that this could happen to any one of us, I became interested in the diagnosis and treatment of tuberculosis and I have maintained that interest ever since. During the ensuing years the progress made has been striking, and it now appears as if there were at least a possibility of accomplishment of the aim of practical elimination of tuberculosis by 1960.

The campaign for the eradication of this disease is based fundamentally on the fact that it is of a contagious nature and caused by a specific micro-organism. This fact was proved conclusively by Koch in 1882 but it took fifty years to realize fully its implications and to evolve an effective plan of control and eradication. Even now we occasionally hear that tuberculosis has been caused by poor nutrition, over work, or debilitating sickness, when we know that this can never happen without the presence of the tubercle bacillus, and that for practical purposes the only source of the organism is the sputum of someone who has already contracted the disease. A few years ago we had to consider bovine infection but this is no longer necessary due to the very successful campaign to eradicate it.

Undoubtedly the delay in realizing the implications of the contagiousness of tubercu-

losis was due to its very long latent period. In measles the clinical disease develops ten to fourteen days after the contact of the patient with the parasite. In tuberculosis the lapse of time may be as many years, but the process is essentially the same, and the disease can be acquired only from some one else who already has it. From a public health standpoint, therefore, the control of tuberculosis simplifies itself into three problems: the treatment of the patient, the discovery of the source of infection, and the prevention of further spread by proper measures of isolation and sputum disposal.

It would seem that the progress in the treatment and control of tuberculosis has followed and depended upon improvements in our methods of diagnosis. There have been three definite steps along this line: first, the use of the stethoscope for the determination of rales after cough, second, the study of the x-ray shadow, third, the wide-spread employment of the diagnostic tuberculin reaction.

It was not so many years ago that we heard the story of the old fashioned doctor who scorned to use the stethoscope in the diagnosis of tuberculosis because he thought he could tell a case of consumption by the appearance of the patient, and because at all events the diagnosis was unimportant, inasmuch as the patient always died. These cases were an unsolved problem for the general practitioner and their care a disagreeable duty to be avoided if possible. The procedure of listening for rales after cough in the upper

part of the chest aided in the diagnosing of early cases, and it soon became apparent that the hope of arresting the disease was greatly increased if the condition was discovered in its first stages

Following the improvement in diagnosis came the building of hospitals especially for the treatment and care of minimal tuberculosis. The advanced cases, the old chronics, were still neglected, and I must say in passing that it was the surgeons who eventually interested themselves in this problem and who have made the treatment of that class of patients fascinating, brilliant, and hopeful

The attention of the medical profession was focused upon early diagnosis, and the more general use of the x-ray was the next great advance in this direction. It was discovered that often the tuberculous process in the lung started before the development of clinical symptoms, and, in fact, that when a patient first realized that he was sick the pulmonary process might have progressed to a considerable extent

Now it is true that a good x-ray will often disclose pathology which is not apparent on physical examination, but reliance on this diagnostic aid is so easy that I fear today we are beginning to neglect the irreplaceable knowledge that we gain from a thorough physical examination. It is sometimes a shock to observe that surgeons and clinicians have not confidence in their ability to evaluate what they can hear through the stethoscope. After all, good medical practice here as elsewhere must rely on what we can see, feel, and hear, and laboratory tests, often of great value, should be used as supplementary aids to obtain more detailed information

Next, the more general use of the tuberculin-testing came into practice, and it became apparent that the beginning of tuberculous infection might occur years before active pulmonary pathology developed, often in childhood. Following the line of reasoning that the earlier the tuberculous patient came under treatment the better the clinical results, there was a marked tendency to build and enlarge children's sanatoriums and health camps. However, it was soon recognized that this early or childhood type of infection was generally not of a serious nature and that hospitalization was unnecessary. These children should be kept under observation, cer-

tainly, to forestall the development of adult pulmonary tuberculosis but the main value of the tuberculin test was, perhaps, in the discovery that they had picked up the germs, thus indicating that they had come in contact with a so-called open case. The problem, therefore, was to discover that open case so that further spread of the disease could be prevented. The effort was at last enlarged from early diagnosis and treatment to include the prevention of infection entirely by the discovery and control of the original source of the disease—those people, be they sick or well, who are expectorating tubercle bacilli

This aim, then, gives us the basis of our present campaign. It is founded on the propositions that we are dealing with a disease whose contagious character is due to the tubercle bacilli in the sputum of those people who are infected with the germ, and that if the disease is to be eliminated these people must be discovered and brought under control so that they will not spread the infection through the dissemination of their sputum

It would seem self-evident that any program for the treatment and control of tuberculosis must rely for its success on the co-operation and approval of the practicing physicians. These are the men who, through their education and life training and the very nature of their work, have the best understanding of the problems involved. These men are primarily interested in the treatment of sick people and are willing to delegate the responsibility of the epidemiological control of the disease to the health authorities and social workers, provided these agencies do not become unduly dictatorial or interfering. The two functions of treatment and control, of course, overlap. Every practicing physician should consider himself a deputy health officer whose duties include the enforcement of practicable health regulations and the discovery of cases of infection, perhaps sub-clinical in nature, who act as foci for the spread of the disease. The health authorities and organizations on their part should make available to the practitioners their diagnosing facilities including, especially, x-ray. It would seem advisable whenever practical to delegate this diagnosing public health work to competent practicing physicians. In this way interest will be stimulated among these men

who are the first to come in contact with the cases of tuberculosis in the general population. Any tendency of the public health authorities to allocate this work entirely to themselves or to assume that the practicing physician is lacking in the knowledge necessary for tuberculosis diagnosis and control is to be deprecated.

In the treatment of the active case of tuberculosis two aims are to be kept in mind: the cure of the patient and the prevention of the spread of the disease to others. The attainment of the first aim, the cure of the patient, still rests on the old and well-proven measures of rest, fresh air, good food, and a proper regime strictly adhered to. In addition, we now have certain surgical measures which are of inestimable benefit in suitable situations. Secondly, to prevent the spread of the disease, we must control the danger of droplet infection by too close contact, and enforce measures of efficient sputum disposal and sterilization of all sputum-contaminated objects. There is no doubt that theoretically the most efficient thing to do would be to hospitalize every active case as long as he is expectorating tubercle bacilli. Under our present ideals of democracy this is not possible and indeed it would often work undue hardship. However, a period of hospitalization would seem advisable for nearly every patient at the beginning of his sickness. This would accomplish three purposes: first, the opportunity of close clinical observation and the use of any special therapeutic measures which may be indicated, second, the education of the patient in the methods of cure and the protection of others from the danger of contagion, third, the prevention of the spread of the disease during the time when the patient is being educated by first hand observation along these lines.

I have spoken of the treatment and control of the sick patient. As in the case of any contagious disease, the second great problem is to find every case of infection. The eradication of tuberculosis depends fundamentally upon this factor, and upon the elimination of each case as a source of contagion.

We are attempting to accomplish the task of case-finding by three main methods: the extensive use of the tuberculin test, especially in children, the x-raying of certain groups in our population, and the diagnosing clinic.

It has been common experience to find that the percentage of tuberculin reactors is on the decrease. This of course means that tuberculous infection is becoming less and that the candidates for pulmonary tuberculosis are becoming fewer. As I have said, the idea that these tuberculin reactors are in need of active treatment is no longer held, and the main value of this work is in pointing the way toward the sources of infection. Where it is possible to make a comprehensive survey of tuberculin reactors among school children at some stage in their education, valuable information can be obtained as to the families and locations that are responsible for the spread of this disease.

The x-raying of certain groups of our population is often too expensive for wide usage. The small size x-ray films bring down the cost materially, but the original equipment is expensive, and hard to obtain on account of the defense program. However, there are certain groups which are especially entitled to this type of accurate examination. First among these, on account of their close association with children, I would place school teachers. Next would come nurses, both for the possibility of exposure to themselves and because of their close contact with persons whose vitality and resistance is lowered on account of sickness. A third important group is patients in mental hospitals where a long period of confinement is necessary. It is a fact that in such institutions where surveys have been made the percentage of tuberculosis increases with the duration of the patient's stay. This means that a certain number of patients develop clinical tuberculosis during their institutional care. The patients come in with one disease and after a period of time they have two diseases. I do not think that these hospitals can hold themselves blameless if they do not adopt periodic examinations of their inmates, including chest x-rays. Other groups such as high school and college students, negroes, and certain classes of industrial workers can well be added to the list.

Probably the most efficient means of case-finding that we have is the diagnosing clinic. The functions of such a clinic are three: to give aid to the practicing physician in diagnosing his cases with suspected pulmonary pathology, to discover cases of latent and active tuberculosis, and to educate the public.

as to the nature of this disease and the means being employed in its eradication. The clinic can be of especial help to the practicing physician in making available x-ray facilities to those patients who would otherwise be unable to obtain them. There is no doubt that x-ray examination is of great assistance in the diagnosing of chest conditions and is often beyond the means of the patient. If the clinic furnishes x-rays and examination on a consultation basis when requested by the attending physician the privilege will certainly be made use of and cases of tuberculosis will be discovered. Even if there is some abuse, it is counterbalanced by the finding of new cases. If the consultation privilege is left to the discretion of the attending physician the clinic will be protected from the criticism of encroaching on his practice. It is true that the private roentgenologist will lose an occasional case, but there is no doubt that the educative value in regard to x-ray diagnosis will amply make up for his loss in the long run. The clinic should be meticulous in adhering to the ethical rules of consultation. This is necessary if the cooperation of the practicing physician is to be maintained. The patient should be returned to his doctor, the information requested should be furnished, and there the connection should cease except in such further matters as may be requested by the referring physician. It is quite possible that he will be glad to be relieved of the responsibility of examining and x-raying the contacts, of arranging the patient's transfer to a sanitarium if this is advisable, or of giving aid in home nursing or supervision.

The educative value of clinic work is probably not generally realized. It is necessary to get people interested in the control and eradication of tuberculosis and to show them how these are being accomplished. There is no better way to do this than by friendly personal contact in the clinic. The patients may come on first admission with a feeling of hesitation, perhaps of mild irritation because they are there due to persistent urging. They should be met with a friendly spirit and there should be a well-organized routine planned for their convenience and to protect their sensibilities. A few personal words from the doctor or nurse explaining what is going on and what it may mean to themselves and the community as a whole may give a favorable

impression and leave the patient with a sympathetic understanding of the work. Too often a little carelessness will bring the opposite result. As to case-finding, the two groups of patients which yield the best results are those referred by private physicians and contacts of known cases. A well-operated clinic can easily have 50 per cent of its new admissions from the first group, and if the work of examining the contacts is vigorously pushed they will almost supply the balance. The examination of contacts is, indeed, of prime importance. It is to be remembered that tuberculosis is a contagious disease and when a case is diagnosed two other problems immediately present themselves to discover if possible from whom this patient acquired his infection, and to examine at proper intervals all persons who come in contact with the case as long as he is expectorating sputum. A few others will come to the clinic on their own volition or at the suggestion of some friend or social agency. In dealing with these cases, also, it is advisable that the clinic confine itself to examination and diagnosis.

A few words as to organization may be added. The clinic should, of course, be under the general supervision of a physician who is interested in this type of work, and who may well be in active private practice. He should regulate the policies and routine employed. It is advantageous that he or his associates examine each case and by personal questions establish the main facts relating thereto. By such procedure only can many conditions be properly evaluated. X-ray alone is not sufficient. It will not indicate whether a tuberculous process is active, nor will it always diagnose accurately such conditions as bronchitis, emphysema, bronchiectasis, cardiac decompensation, etc. Subsequent to the clinic session, as soon as can be arranged, and in the presence of the nurse, he should look over the x-rays, verify his diagnosis, and formulate his recommendations. This report should then be sent to the referring physician.

The nurse in charge should have experience and enthusiasm for this work, because on her, no less than on the clinic doctors, rests the responsibility for success. She and her assistants should organize and prepare for the clinic in advance, arranging the examinations by appointment as much as possible. She is responsible for the preliminary history-taking,



the preparation of the patient, and his guidance through the clinic routine without undue delay or inconvenience. She must see that the referring doctors get their reports. The clinic records are her responsibility. These should be kept in accordance with the rules of the governing health authority and in such a way that there will be a clear picture of the families and locations from whence infection is liable to spread. The clinic patient should get the impression of a well-planned, smoothly running organization. If treated with consideration he will willingly cooperate in the steps of history-taking, interview and ex-

amination by the doctor, and x-ray and other laboratory procedure. He will return to his own physician with interest in the final report which he will obtain from him, and it is to be hoped that he will be stimulated to some constructive thinking about tuberculosis control as a general problem as well as an individual one.

In this paper I have attempted to give an idea of the development of our present day methods of tuberculosis control and of their working application, especially in regard to the diagnosing clinic.

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## Percussion of the Clavicle

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Spokane, Washington

Percussion of the clavicle has never been given prominence in physical examination. While few of the text books mention the subject at all, occasionally a brief description is found to the effect that the bone is resonant in its central portion, tympanitic towards the sternal end, and dull towards the acromial end. In practice one usually sees the direct type of percussion used in a more or less perfunctory manner with seldom any great amount of information obtained.

If the bone is to be percussed, the indirect method should be used. It will be found then that the resonant portion can be accurately outlined and will vary characteristically when disease is present in the lungs beneath. The resonant areas or clavicular bands are not truly central in location, but are to be found nearer the sternal end of the bones. They show some variation in size and location in normal individuals but are symmetrically placed and equal in size in individuals with normal lungs and chest cage. The bands in adults normally measure 4 to 6 centimeters and their percussion note is unmistakably resonant. At the medial border the note changes to tympany, at the outer, to dullness. In children the inner border frequently is much nearer the sternum than in adults and at times may be medial to the sterno-clavicular joint.

The borders do not regularly coincide with the actual lung borders or the anterior borders of Kroenig's areas of reflected resonance.

Infiltration of the lung produces a narrowing or contraction of the band. This contraction occurs even if the infiltration is a considerable distance below the clavicle. With dense infiltrations the resonance of the band becomes greatly reduced, however a contracted band of impaired resonance can still be identified. Occasionally a slight decrease in resonance may appear near the border of the band as occurs in Kroenig's sign. Such slight changes are disregarded as the contraction will still be present if the border is outlined at the point where resonance entirely disappears.

Emphysema of the lung causes a widening of the band. Here the median border moves inwards, at times even beyond the limits of the clavicle. The outer border moves laterally, now including in the band part of the area usually dull. The widening effect of emphysema is so well pronounced that when infiltrations are present in an emphysematous lung the band will usually take the expansion of emphysema, rather than the contraction of infiltration.

Widening of the band is also found in pneumothorax when the apex of the lung falls below the clavicle or pulls away from the anterior chest wall. With less marked collapse, where lung structure is still present above

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the clavicle in apposition to the anterior chest wall, the band will show contraction

Changes in the contour of the chest cage which accompany scoliosis displace the bands but do not change their size. Displacements occur outwards on the side showing prominence of the anterior ribs, and inwards on the opposite side where the ribs are flattened.

In percussion no great care need be exercised in the position of the patient, but the clavicles should not be forcibly elevated or pulled backward. The pleximeter finger should be placed with firm pressure at right angles to the bone. Percussion should start in the resonant portion and the borders sought by

moving the fingers in either direction. Approaching the borders the pleximeter should be moved little by little by sliding the skin over the bone rather than by raising the finger from the surface of the skin. As in all percussion, the strength of the blow is varied with circumstances and that blow used which seems most suitable for the particular patient. Difficulty may be experienced at times with the right lateral border where in normal individuals a slight percussion change is sometimes found inside the true border. Some difficulty may also be experienced with the inner border in cases with sharply deviated trachea, where the contrast lies between resonance

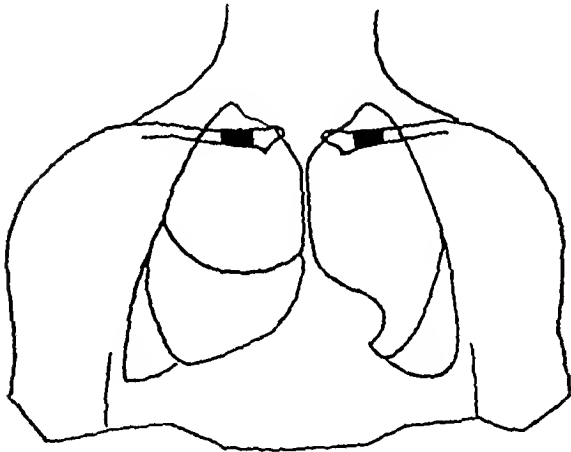


FIGURE I

*Clavicular bands shown as solid areas on clavicles*

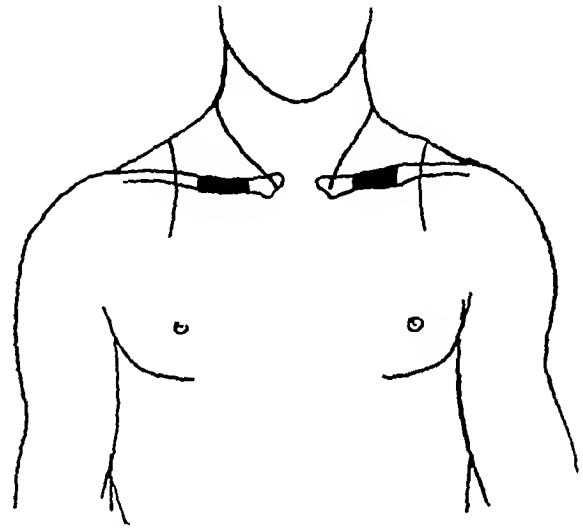


FIGURE II

*Kroenig's areas outlined by lines—clavicular bands shown as solid areas on the clavicles. The borders of the bands are usually found inside the prolongation of Kroenig's lines*

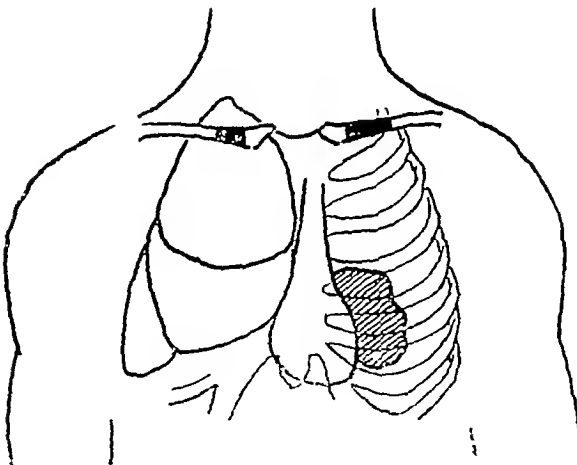


FIGURE III

*Pneumothorax—showing widening of clavicular band in complete pneumothorax*

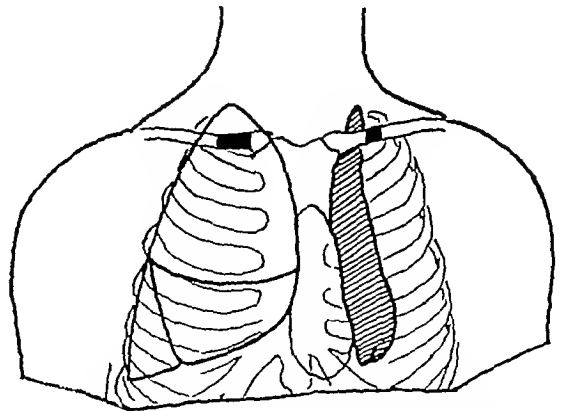


FIGURE IV

*Pneumothorax with part of compressed lung still above clavicle—band contracted*

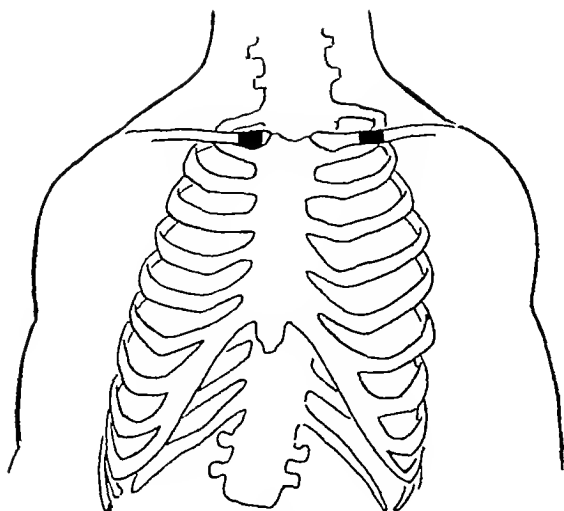


FIGURE V

*Dislocation of the clavicular bands in scoliosis*

and a more marked tympanitic note than is usually present

Occasionally large cavities have a tendency to widen the band. Cases of pleural thickening over the extreme apex, with but little subpleural infiltration, may not produce the expected contraction of the band. Frequently the bands may widen slightly after expiratory cough and forcible respiration, so that when doubt is present it is wise to check the examination again after auscultation.

In addition to the information elicited by the size of the band, clavicular percussion is of value in comparing the percussion note of the two lungs. Here also indirect percus-

sion should be used. Small differences in resonance are readily recognized but as elsewhere the comparison should be made in corresponding areas, preferably the center of the band.

*Application.* Any procedure which assists in the recognition of infiltrations in the upper parts of the lung is of value in physical examination. It is to be regretted that the current medical literature seems more and more to preach the inadequacy of physical examination in early pulmonary disease. Possibly hurried percussion in noisy examining rooms explains the general lack of results from this time-tested procedure. Adding clavicular percussion to the percussion of Kroenig's isthmi and careful percussion of corresponding areas, fewer infiltrations will pass unrecognized. Percussion of the clavicles has been particularly helpful in examining severely ill bed patients where the accessibility of the bones provides a great advantage over the awkwardness of percussing the neck for Kroenig's borders. In emphysema the sign brings to mind at once the condition of hyperventilation and points to the necessity of using signs and procedures possibly not common in routine study. In instituting a pneumothorax at home, where the fluoroscope is not available, the widening of the band signifying a successful apical collapse is most welcome.

It is thought that the procedure described is of sufficient value that it could well be added to all routine physical examinations of the lungs.

## NOTICE

The Annual Directory of the American College of Chest Physicians containing the membership roster is now being prepared for the press. Changes in address and other corrections should be mailed to the executive offices of the College promptly.

## Meeting of the Council on Undergraduate Medical Education\*

The Council on Undergraduate Medical Education of the American College of Chest Physicians met at a luncheon session at the Hotel Statler, Cleveland, Ohio, June 1, 1941. Dr. Edward W. Hayes, Monrovia, California, Chairman of the Council, presided, calling the meeting to order at one-thirty o'clock.—Ed

*Chairman Hayes* I am sorry to start while you are eating, but unfortunately we were a little delayed in getting started with the serving, and if you will excuse me for calling you to order at this time, we shall proceed.

Needless to say, I am extremely happy, as Chairman of this Council, to see the fine turnout at this meeting. I believe I have learned something today, that is, that after this when I preside at a meeting, I shall make it clear that the speeches will be made by others than myself. It seems to have worked very well.

Some of you men have been listening to me talking on this subject for a good many years and my own remarks today are going to be brief.

I think all of you understand that one of the principle objectives of the American College of Chest Physicians is to bring about in the medical schools of the country conditions which will provide for a more satisfactory teaching of chronic diseases of the lungs, particularly tuberculosis. The idea is to have this subject presented in such a way to the future doctor while he is still a student that when he goes out to practice medicine he will have a practical understanding of the facts that have to do with the diagnosis of tuberculosis in its early stages and a knowledge of the principles involved in early and effective treatment of tuberculosis. He will also understand the factors that have to do with the prevention of tuberculosis and because of this understanding and knowledge, he will be able and willing to take a leading part in putting these factors into effect.

I think most of you agree that the average medical graduate today does not possess this understanding or knowledge. During the past five years, this Council has, at two different times, made a detailed study of the condi-

tions under which chronic diseases of the lungs are taught in the medical schools throughout the United States. It also has studied the report made by the Committee of the American Medical Association on their survey of the medical schools. It is the opinion of the Council that there are not more than ten or twelve of the medical schools in this country that give the student a practical working knowledge of tuberculosis. If the student does not get this while he is in school, he has very little opportunity to obtain it after graduation. In the institutions where internships are served, only one out of every twenty-four offers a tuberculosis service, and in some, at least of those places where such a service is offered, it is not very efficient.

In the absence of a specific for the treatment of tuberculosis, we have to depend upon an educational campaign in our efforts to control this disease. In the past, this campaign has been carried on, for the most part, by the laity. The medical profession, except in the case of a few who either have had tuberculosis themselves or have had it occur in their families or who by chance have been brought into professional contact with the disease, has played a very minor part in the anti-tuberculosis campaign.

In other words, in the past we have had the cart before the horse, because we have failed to educate those who in turn should do the educating, since we have failed to give the doctor in the making, a practical knowledge of tuberculosis.

It is not the thought of this Council that the students should be made specialists while they are in school but simply that they should be made tuberculosis conscious, so that they will know how to think and how to advise in regard to tuberculosis when they go out to practice medicine and can assume the leadership in the control of tuberculosis. Again, it is not the thought of this Council that the medical schools in general should be asked to devote more time to the teaching of this subject, however, in a minor proportion of the schools, more time will have to be allotted if the subject is to be handled

\*Presented before the Seventh Annual Meeting of the American College of Chest Physicians, Cleveland, Ohio, June 1, 1941.

adequately What this Council does ask is that the time allotted to tuberculosis in the regular teaching schedule of the medical schools be used so that the subject will be presented to the student in a systematic and orderly manner This is not done in most schools at the present time and it is due largely to this lack of system in the way the subject matter of the course is arranged, as well as in the way it is handled by the instructors, that the medical student fails to receive an adequate training

I have asked some of the men who have been particularly interested in this subject and who are prominent teachers in this part of the country to speak to you briefly today and to tell you their experiences and their ideas I hope that when they have finished, we shall have time to have expressions from others of you who are here, as this Council is very desirous of obtaining your ideas on the work it is endeavoring to carry out We realize, of course, that the big problem is to have this schedule put into effect in the medical schools and I hope that if any of you have any suggestions for the solution of that problem, you will offer them to us at this time

I am going to ask Dr George Ornstein to open the discussion

*Dr George G Ornstein, New York, N Y*  
Most faculties in arranging their curriculum are aware of the importance of teaching tuberculosis, and yet they will limit the time for this important subject to a few hours in the third and fourth years The reason is a simple one There is too much subject matter to cover in so short a period as four years and very little time can be allotted to the specialties Besides, medical schools believe that their sole purpose is to prepare their students for entrance into medicine and surgery and their future development will depend upon training during internship and further postgraduate studies They also relegate the specialties entirely to postgraduate study and try simply to give their students a superficial concept of most of the specialties

Dr Hayes, the chairman on education, in teaching tuberculosis to the undergraduate student, has worked very hard to improve such teaching He and the members of his Council have mapped out in detail a schedule

for teaching, consisting of a minimum of 76 hours or more, divided over a period of four years Such a schedule would be ideal I may state that in the medical schools in New York City they usually have a two-week elective and all of the students do not elect to have it

In one of the schools where I have been in charge of the teaching of tuberculosis, the time allotment has been shortened from one morning every week of a trimester both in the third and fourth years, to a paltry twenty-four hours *divided between the third and fourth year* This change was a very interesting experience The school is a very progressive one and has been constantly improving these past five years As the school improved, there was less and less time for specialties The men responsible for the curriculum were very fair and tuberculosis suffered no more than other major specialties Our problem then was to stimulate an interest in a complex subject like tuberculosis in the few hours allotted to us We experimented with our methods of teaching We found the student displayed no great interest when we stressed early diagnosis, discussed history and physical findings, and displayed a few patients and x-rays The students were attentive, but with the end of the course their interest ceased We then decided to utilize the first 12 hours in the junior year by devoting it entirely to pathogenesis We made certain that the students were acquainted with the complete pathogenesis of primary and reinfection tuberculosis We made certain that they could identify the various forms in x-rays During this period we also made sure that each student could use a stethoscope and furthermore could interpret the sounds heard with the stethoscope Every minute of the 12 hours was utilized The slow students were urged to come one-half hour earlier than the class for special training in auscultation

The third year students could hardly wait to apply their knowledge on the wards in the fourth year We avoided selected clinics We worked from bed to bed The students worked up and presented their cases and we were able to cover about eight cases a morning and at the end of the 12 hours at least 32 cases of tuberculosis were presented covering all phases of tuberculosis Students were

urged to read a great deal. The course in the third and fourth years consists of four successive Mondays. This fits in well with allotment of subjects for reading and debate. We have stressed the fact that there is no unanimity of opinion and the students must decide for themselves which is the correct opinion and were urged to formulate their own. This in itself stimulated more reading.

We have carried on in the above manner for the past five years. There has been a continuously growing interest in tuberculosis year by year. The interest this year became so great that the junior class persuaded the faculty to allow them to have a clerkship for two weeks at Sea View Hospital during the summer months. Fifty per cent of the students (forty in number assigned for this elective course) elected to take the two-week clerkship, and the faculty is willing to make it a permanent elective if it is successful this year. We at Sea View promise you it will be successful.

For the present the important work of this Council is to see that tuberculosis teaching is a part of the program of every medical school. Let us work out how interest in tuberculosis can be stimulated in a small parcel of time. Let us try to stimulate the student to desire the experience of a clerkship in the local sanatorium. Let us also stimulate both local and distant sanatoriums to open their doors to the undergraduate medical students for further education in the form of clerkships during the vacation period between the third and fourth years. This teaching at the sanatorium could be worked out under the guidance of the medical school. It is my impression that we might be more successful in persuading the medical student to give us this extra curriculum time.

*Chairman Hayes* Thank you very much, Dr. Ornstein. I am going to ask Dr. Ralph Matson to continue the discussion.

*Dr. Ralph Matson, Portland, Oregon* I must say that I feel very grateful to Dr. Hayes and to the members of this Council because, as a member of the curriculum committee of the University of Oregon Medical School, one of the duties assigned to me by the rest of the committee was to break down the hours devoted to tuberculosis.

As a matter of fact, I have forgotten the

exact number of hours which were your maximum but we have gone four hours over that.

*Chairman Hayes* 186 is the maximum number of hours.

*Dr. Matson* How we have gotten these additional hours I cannot explain, but one of our problems was to get the bacteriological department and the pathologists to outline the details of what they were teaching. I mean to say, that it was not sufficient for them to say that they gave a course on it, they had to outline every detail of it, how it was carried out and to what it was devoted in the first year, hour by hour.

Then in pathology, we found that one of the pathologists would be teaching one classification and another would be teaching another, so I gave them Goldberg's book and it was adopted. Then in the third year, the class is broken down into groups. They go into the out-patient clinics. All this teaching is done in the new State University Tuberculosis Hospital where we have a very large medical amphitheatre which accommodates the entire class and a surgical amphitheatre which accommodates half the class. I have the senior class for one hour throughout the entire year.

My responsibility is to the senior class, however, I am responsible for the entire course in tuberculosis.

The senior attendance is compulsory. The students are very carefully checked to note that we have 80 per cent attendance for these hours.

In the third year, the classes are broken into groups for clinical purposes, and the same in the senior year. There are also two elective courses, one on medical aspects and one on surgical aspects. It is our idea that the students will have complete visualization of the various surgical procedures and the students are compelled to attend. They will see at least one of every type of operation which is done. The out-patients' clinic is also in this hospital and there they have abundant material and time to work with these out-patients. They are also engaged in the follow-up and social service work.

I don't think there is any more that I can say on the subject.

*Chairman Hayes* I should like to have you say a word, Dr. Matson, if you will, on how adaptable you feel the schedule published last

year by this Council may be to any particular medical school, inasmuch as you have studied it in detail

I have studied it. I turned the recommendations of your Council over to the curriculum committee and they studied it at length in my absence, and it was accepted. I see no reason why any medical school could not adopt the program that you have offered. There are going to be some fights in the departments of bacteriology and pathology, they may have their own ideas, but I think it could be worked out.

*Chairman Hayes* Thank you very much, Dr Matson

I appreciate hearing from Dr Matson. He is one of the teachers who took our schedule, even before it was published, and I think he has made a very serious effort to put it into effect in his school. I am particularly happy to have him here and to have him tell us about it at this time.

I do not want to talk too much, but I wish to express one or two ideas of the Council. Dr Matson mentioned the fact that he met the senior class throughout the year. The Council feels that, inasmuch as tuberculosis is a chronic disease, it is not a disease of a few days or a few weeks, but is a disease of months and years. Therefore, in order to teach it effectively, the course should extend throughout the year. As you know, during the course of tuberculosis, there are many unexpected changes that take place, and, in order to have the students understand and appreciate these changes, they must have an opportunity to follow the patients along through the course of the disease from the beginning to the end if possible.

Again, if we are to teach tuberculosis effectively in the medical schools, we must have proper teaching material. According to our survey, a good many schools do not provide this. In addition, we must have teachers who are capable and willing to teach. Dr Zapffe, the secretary of the Association of Medical Schools, is interested in the work of this Council. In my talk with him he expressed deep interest. He said that in his work there is one thing he cannot do, that is, he cannot make teachers.

Dr Raymond C McKay of Cleveland will speak now.

*Dr Raymond C McKay, Cleveland, Ohio*

My special interest in this subject began about four years ago with the observation that the interns who passed through our hospitals showed, in my opinion, an amazing lack of the modern concepts of tuberculosis, not only in regard to the ordinary clinical aspects of pathogenesis, diagnosis, and treatment, but also in regard to the public health and pathological aspects.

That observation, I think, is unusually significant in view of the fact that our institution has each year about forty new interns, who, over a five-year period, have represented some forty-five of the Class A medical schools. Moreover, our intern committee assured me that the men selected had all come from the upper third of the class in their respective schools so that I thought I had a fairly good sampling of what was *not* being accomplished in the teaching of tuberculosis throughout the country. At first I had what I think now is a rather foolish idea that it might be possible for some national organization such as this one, or the National Tuberculosis Association, to bring some pressure to bear upon medical schools, but after a number of conversations with older and wiser heads I have been convinced that medical school faculties are not very amenable to coercion, and I have come to the conclusion that the real solution of the problem lies in continuous efforts on the part of such organizations as this to educate the educators. I should add that I think real progress is being made, and that the men who come to us today are better prepared in tuberculosis than were those of four years ago.

With regard to our own problem in Western Reserve University, our situation, I think, is a little different from that which Dr Hayes described for the average medical school. I don't believe that we have enough time devoted to tuberculosis. I am well satisfied with their preliminary instruction in pathology and bacteriology, but the time allotted to the teaching of clinical tuberculosis is limited to a series of lectures totalling about fourteen hours, in the third year, plus four or five hours in chest surgery, and a total of about eight hours for clinics, given to small groups in the fourth year. I don't think that is enough time. What distresses me most of all is that we have as rich teaching material, easily and conveniently available, as I could



well imagine What I would like to accomplish is to get the continuous, undivided attention of our senior students, for even so short a period as one entire week I think if they could be made to think about tuberculosis and its problems consecutively for even a few days they would absorb a great deal more than they do now when they think about tuberculosis for one hour, and then forget it for a week and then think about it for another hour, and so forth

You might be interested in this story One of our residents, whose education had been obtained in a well-known teaching hospital associated with a prominent southern university, remarked that he had always thought that his hospital could hold its own with the rest of the world in practically every branch of medicine and surgery, but he had to confess that he was ashamed of the way they handled tuberculosis I think that if we could succeed in getting such a conception into the consciousness of medical students generally, perhaps they could exert more effective coercion on the medical faculties than can be imposed upon them from the outside

*Chairman Hayes* Thank you very much, Dr McKay

The Council realizes that it is a delicate proposition to approach medical school faculties on this particular subject It also realizes, however, that if we do not start, we shall never get anywhere Now that we have made a start, if we continue our efforts and keep hammering away, we shall eventually accomplish our purpose It may take a long time, but the Council believes that the results obtained in the end will be worth the effort

In regard to interns, you know that we have about 130 interns in the Los Angeles General Hospital, and it has been my privilege to work with those men and women for the past twenty years They come from all over the United States and they are a select group of medical graduates It was through working with these interns that the feeling, which I have had since I was a medical student myself, that something should be done to improve the teaching of chronic diseases of the lungs in the medical schools, was greatly enhanced Dr Kupka, here, who is now on the staff of the Los Angeles General Hos-

pital, shares that same feeling

I wager to say there is not a teacher here that has not had the experience of having his students say to him that he tells them something that is entirely different from what some other teacher in the same school has told them That is due to lack of system What we need is system in the presentation of this subject

We have a few minutes left I want to hear from you men

*Dr Aaron Ketnigsberg, Chicago, Illinois* It has not been so long since I sat on the benches of a medical school so that I can still remember the difficulties students have in acquiring some knowledge of tuberculosis The comments which you made are only too true It is not only that medical students are not given enough time in tuberculosis, but they are also given a great deal of misinformation both as to the symptoms and the physical findings of this disease As recently as 1935 Norris and Landis in their textbook on diseases of the chest presented a series of fifty cases of tuberculosis in which the authors stated that nearly seventy per cent of the cavities were diagnosed by the presence of tympany The more recent editions of this book have been improved but unfortunately many textbooks on medicine or physical diagnosis still present to the medical student and practitioner the myths which have descended from the time of Auenbrugge and Laennec The same thing is true for the teaching of the symptoms of tuberculosis

I was at Oakdale when Dr Peck started a course in tuberculosis for medical students attending the University of Iowa and I can recall some of the difficulties we encountered at that time It is not only important that more time should be allotted to tuberculosis in the curriculum, but either phthisiologists should do the teaching, or those professors of medicine who lack extensive practical experience in this field should themselves first learn the modern concepts of tuberculosis before trying to teach this subject

About a month ago I was present at a hospital staff conference in Chicago when the problem of tuberculosis in pregnancy was discussed Except for the taking of heart tones, I am convinced that a stethoscope in the hands of an obstetrician is a dangerous weapon Many of the men at the confer-

ence still believed that most cases of tuberculosis could be diagnosed by physical examination alone, no matter what the stage of the disease. I can still recall my experiences with the routine re-examinations of patients as an intern on the tuberculosis service at Cook County Hospital. The majority of these patients had been in the institution for many months with moderately advanced and far advanced pulmonary lesions. Month after month the interns who preceded me had all found and recorded similar abnormal physical findings which were consistent with the x-ray films. But when I examined the same patients, much to my chagrin I was able to elicit few or no abnormal findings despite x-ray evidences of extensive disease. In an attempt to conceal what I thought was lack of skill on my part and to show that I was as competent an examiner as the others, I would write on the histories the same physical findings apparently found by my predecessors. Of course all of us here realize that all too frequently advanced pulmonary disease may occur in individuals presenting few or no abnormal physical findings but for some reason this important fact is not stressed by the teachers in the medical schools. The students, therefore, become confused when the physical findings fail to conform to the lesions seen on the x-rays.

I think it would be advantageous to ask Dr Peck about the program for teaching tuberculosis which he has initiated at Oakdale where senior medical students receive a two weeks' course. I have talked with some of these students and they have informed me that they consider this short course to be of more practical value than many other and longer courses which they have taken during their four years of medical school. This is because these students have an opportunity not only to acquire some knowledge of abnormal physical findings, but also, and of equal importance, to learn the limitations of auscultation and percussion. In addition, the students themselves soon realize that a sound training in the fundamentals of pulmonary tuberculosis provides an excellent foundation for the study of all chest diseases.

I am sorry to have taken up so much time but I feel very strongly about the whole problem of tuberculosis teaching in the medical schools.

*Chairman Hayes* Thank you, Doctor. I assure you that you hit a chord there to which we are all very responsive when you spoke about the internists. Dr Peck, would you like to speak for a few moments and tell us about what you are doing at Iowa University?

*Dr John H Peck, Oakdale, Iowa* In our rather extensive experience with undergraduate teaching, we have discovered that the average medical student has acquired numerous misconceptions from various departments in the medical school regarding tuberculosis as a clinical entity. When senior students come to our sanatorium for a two weeks' clinical clerkship, we find it necessary to review their fundamental knowledge of tuberculosis and assist them in correcting this misinformation. Doctor Ornstein has apparently had the same experience.

The students are in residence at the sanatorium a total of eighty or ninety hours, thus presenting an unusual opportunity for intensive instruction in small groups in the classroom, in addition to demonstrations on the wards and in the laboratories. During afternoon rest hours, when we insist that the patients not be disturbed, is a fine time to use for didactic teaching. We aim to impress students with the conception that tuberculosis is a disease with complex manifestations and variations, and apparently they obtain an entirely new and rational viewpoint, leading to a better understanding of the disease, particularly the pulmonary type.

We thus are able to train students to attempt to correlate all the evidence obtainable by themselves and from the clinical records. Finally, they really appreciate the fact that tuberculosis is still a common disease, that frequently it is not easy to recognize and often difficult to treat. It seems to me that we are attaining reasonable success in our program of undergraduate instruction.

*Chairman Hayes* Thank you, Dr Peck. We have a little time remaining, and I should like to hear from some of the rest of you.

*Dr Maurice Kovnat, Staten Island, New York* As a body representing the important specialty of chest diseases, the College should formulate its program of medical school education to include all pulmonary diseases and not limit itself to tuberculosis. It should specifically enumerate the schedule for the teaching of these subjects in the medical

school curriculum. Many of them, though very important, are at present only glossed over, some of them, the medical students do not even hear mentioned. It is our duty to see that they are all given their rightful place in the teaching of medicine. No other agencies specifically concern themselves about this. We are the guardians of these students. To list only a few, pulmonary neoplasm, fungus pulmonary diseases, bronchiectasis, empyemata, pulmonary infarction, pulmonary abscess, acute respiratory infections, bronchial stenosis, bronchial foreign bodies, pulmonary circulatory derangements, cystic diseases, pneumoconiosis, emphysema, atelectasis diseases of the mediastinum and pleura, etc, etc.

As regards tuberculosis, any program the College sponsors should be based on the well established principles that

1) The tuberculosis control problem will only be solved when (a) the open case is discovered and isolated, and/or converted to a closed case, and (b) the early case is discovered and adequately treated to prevent its becoming an open case.

2) The general practitioner is the keystone in the problem of tuberculosis control.

Based on these principles, the aim of any program the Council formulates should be to create a constant awareness on the part of the medical student just as soon as he assumes the responsible role of practitioner, to the possible existence of the disease of tuberculosis. No amount of time spent in learning tuberculosis in medical school can make a specialist or even an adequate healer of tuberculosis of the medical student. On the other hand, only a relatively short period of intensive, practical, close clinical contact with all the aspects of the disease, given late in his medical course, such as living in a tuberculosis hospital or sanatorium, will be necessary to create this attitude of awareness to the disease on the part of the student. When he becomes a practitioner, he will have developed a proper respect for this dreaded disease. With the aid of the specialist, without whose help he can never hope adequately to master the disease, any more than a deck-hand can sail a ship through treacherous waters, he will ultimately conquer the *disease tuberculosis*.

In summary, the College should sponsor

a medical school program to include all pulmonary diseases. As regards tuberculosis, short practical courses in a hospital or sanatorium, directed to the senior students that would create a constant awareness of the disease, are preferable to detailed didactic courses or lectures. They should be properly prepared to detect tuberculosis and other chronic diseases of the chest when they go out into private practice.

*Dr Arthur Q Penta, Schenectady, New York.* The American College of Chest Physicians should be congratulated for establishing this highly important Council on medical school education. Dr Edward W Hayes and his co-workers deserve much credit for the splendid work that they have done. From my observation during the past ten years, it is with regret when I tell you that a large measure of the success in the fight against tuberculosis has not been due to the activity and leadership of the medical profession, but rather to the many campaigns sponsored by various civic organizations. In part, this situation has been brought about by inadequate emphasis and a lack of interest in the teaching of tuberculosis in our medical schools. There are many men today in the field of general medicine who do not realize their responsibility to the community in the management of patients suspected of being tuberculous, nor do they fully realize the potential danger to the community which may result from the neglectful management of chronic open cases of tuberculosis.

At Temple University Medical School, under the able teaching of Dr A J Cohen, the students are given a thorough course in all phases of tuberculosis. Several years ago, the progressive dean of the medical school, Dr W N Parkinson, realizing the importance and the difficulty so often encountered in the differential diagnosis of chronic pulmonary diseases, instituted a short course on the mycotic and chronic bacterial pulmonary infections to be given in conjunction with the course in tuberculosis. Today, the graduates of Temple, although tuberculosis conscious, realize the close resemblance of this type of infection with that of other pulmonary conditions and have been taught not to delay in carrying out diagnostic procedures extremely essential in establishing a definite diagnosis.

Previous speakers have already emphasized

the need of competent teachers to conduct the teaching of tuberculosis in our medical schools. This is a very important point and one in which the College, through this excellent Council, should contact the deans of the medical schools and offer suggestions regarding the proper method of teaching this very important subject.

Mr. Chairman, I wish to thank you for the courtesy extended to me to take part in this discussion.

*Chairman Hayes:* Thank you, Dr. Penta. Our time is up, unless someone has something special to say.

As I said a little while ago, our Council was very much encouraged by the fact that Dr. Ralph Matson asked for our schedule even before it was published. We have been further encouraged by a number of other schools writing in during the past year and asking for the schedule, and assuring us that they

were desirous of putting it into operation, as far as possible, in their institutions.

We have had another very encouraging move. As I told you last night, as Chairman of this Council, I have been asked to go to Richmond, Virginia, in October to talk at the Annual Meeting of the Association of Medical Colleges on the subject of teaching tuberculosis. The Council is very happy about this, because we feel that it is a step in the advancement of this program.

I wish that you people would think about this, and send me any suggestions which you may have that might be incorporated into the talk to the medical deans at their Annual Meeting in Richmond.

If there is nothing else, I want to express my appreciation to the men who talked and to all of you who have come here today. Thank you very much.

Adjourned at two-thirty p. m.

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## Organization News

### COUNCIL ON UNDERGRADUATE MEDICAL EDUCATION

Dr. E. W. Hayes, Monrovia, California, Chairman of the Council of Undergraduate Medical Education of the American College of Chest Physicians, has recently mailed letters to the Deans and Heads of Departments of Medicine in each of the accredited medical schools in this country and Canada, as well as to the Governors, Regents and officers of the state and district Chapters of the College, in connection with a concerted campaign to improve the teaching of tuberculosis and other diseases of the chest in the medical schools.

The July issue of the Journal of the Association of American Medical Colleges published an address made by Dr. Hayes entitled "The Teaching of Tuberculosis" which he presented before the Fifty-Second Annual Meeting of the Association of American Medical Colleges at Richmond, Virginia, October 27-29, 1941. Reprints of this talk may be obtained by writing to the Executive Offices of the College at Chicago.

Dr. W. W. Chrisman, Macon, Georgia, a Fellow of the College, was elected president of the Eighth District Medical Society of Georgia. Dr. Chrisman was also appointed as a member of the Industrial Health Committee of the State Medical Society.

Dr. Carl C. Aven, Atlanta, Georgia, a Fellow of the College, was named Chairman of the Tuberculosis Committee and Chairman of the Committee on Revision of Pharmacopoeia of the Georgia State Medical Society.

Dr. J. Cox Wall, Eastman, Georgia, a Fellow of the College, was elected as Vice-Councilor for the Third District of the Georgia State Medical Society. He was also appointed as Fraternal Delegate to the South Carolina State Medical Society.

Dr. J. C. Metts, Savannah, Georgia, a Fellow of the College, is serving as a member of the State Board of Health for the First District.

Dr Carl O Schaeffer, Racine, Wisconsin, Governor of the College for Wisconsin, read a paper before a special meeting of the Racine County Medical Society held at Sunny Rest Sanatorium on June 17th Dr Schaeffer spoke on "Artificial Pneumothorax at Sunny Rest"

Dr W P Harbin, Jr, Rome, Georgia, a Fellow of the College, was appointed a member of the Committee for the Abner Wellborn Calhoun Lectureship of the Georgia Medical Society He was also appointed as a member of the State Board of Health for the Seventh District

#### DR STUBBS HONORED

Dr Frederick D Stubbs, Philadelphia, Pennsylvania, a Fellow of the College, delivered the Third Annual Oration on Surgery before the Annual Meeting of the National Medical Association held at Cleveland, Ohio, August 17-21 Dr Stubbs spoke on "Fundamental Physiological Concepts Underlying Major Surgery of the Chest"

Dr Karl Pfeutze, Cannon Falls, Minnesota, a Fellow of the College, discussed "The Importance of Early Diagnosis and Treatment of Tuberculosis" before a meeting of the Rochester Kiwanis Club, Rochester, Minnesota

Dr W E Overcash, formerly of Southern Pines, North Carolina, a Fellow of the College, has opened offices in Roanoke, Virginia

Dr John S Packard, Allenwood, Pennsylvania, a Fellow of the College, has been elected as President of the Montour County Medical Society

Dr Oren A Beatty, Glasgow, Kentucky, a Fellow of the College, has accepted the appointment as medical superintendent of the Richland County Tuberculosis Sanatorium, Mansfield, Ohio

Dr F H Alley, Oakville, Tennessee, an Associate Member of the College, is at present located at the Victor C Vaughn House, Ann Arbor, Michigan

#### IN MEMORIUM

It now becomes our sad commitment to pause in solemn reverence in the observance of those of our members who have departed this life during the past year May their deeds and accomplishments stand firmly emblazoned upon the rustless shields of service, and may their souls rest in peace within the sacred walls of Valhalla Sharply chiseled into those ageless stone slabs of posterity, we find the names of

Dr S P Bittner, Glendale, California  
 Dr Warren C Breidenbach, Dayton, Ohio  
 Dr Seymour Cohan, Chicago, Illinois  
 Dr Charles DeWitt Colby, Asheville, N C  
 Dr Charles A Dukes, Oakland, California  
 Dr Andrew Peters, Springfield, Mass  
 Dr LeRoy S Peters, Albuquerque, N M  
 Dr William J Ryan, Pomona, New York  
 Dr Leon Shulman, Los Angeles, California

#### PENNSYLVANIA CHAPTER TO MEET

The Pennsylvania Chapter of the American College of Chest Physicians will hold their annual meeting at Pittsburgh, Pennsylvania, on Sunday and Monday, October 4 and 5 The annual banquet will be held Sunday evening, October 4, and the scientific program will be presented Monday morning, October 5

An interesting program has been prepared for this meeting and all members of the College in Pennsylvania and in the surrounding states are invited to attend this meeting For reservations and other information pertaining to the meeting, kindly communicate with Dr Edward Lebovitz, Secretary-Treasurer, Pennsylvania Chapter, 412 Jenkins Building, Pittsburgh, Pennsylvania

#### ERRATUM

In the paper entitled "The Diagnosis and Treatment of Chronic Perennial Asthmatics" by Drs Alexander, Julian A, and Beatrice E Sterling, Philadelphia, Pennsylvania, published in Volume VIII, No 7, July, 1942, issue of the journal, page 202, (P D Co) should be placed after "(b) stock special catarrhal vaccine" This was placed in error after "(c) dust extract from specific environment"—Ed

Dr Frank Seligson, Glencliff, New Hampshire, a Fellow of the College, has accepted a position as resident physician at the Edward Sanatorium, Naperville, Illinois

## New Members Admitted to the American College of Chest Physicians Since the Publication of the 1941 Pneumothorax Directory

### FELLOWS

Amaral, Francis M., Point Loma, California  
 August, Myron, Cleveland, Ohio  
 Aycock, George F., Denver, Colorado  
 Banquer, Jacob E., Boston, Massachusetts  
 Barnwell, John D., Honolulu, Hawaii  
 Bell, Robert G., Ottawa, Illinois  
 Belmont, M., Youngstown, Ohio  
 Benedict, Mitchell M., Yonkers, New York  
 Beringer, Lester E., Camp Claiborne, Louisiana  
 Blum, Milton, Jersey City, New Jersey  
 Boots, Edmund C., Pittsburgh, Pennsylvania  
 Borshaw, Hyman, Jersey City, New Jersey  
 Bortone, Frank, Jersey City, New Jersey  
 Bowers, Berna T., Panama Canal Zone  
 Brachman, David S., Detroit, Michigan  
 Brahdy, Leopold, New York, New York  
 Brock, Benjamin L., Waverly Hills, Kentucky  
 Brownstone, Sidney, Clear Lake, Iowa  
 Cahill, John D., Bronx, New York  
 Caplovitz, Harry, Houston, Texas  
 Castellano, Martin, Verona, New Jersey  
 Chadwick, Leon A., Middle Grove, New York  
 Cherry, Homer H., Patterson, New Jersey  
 Chester, William P., Detroit, Michigan  
 Christiansen, James N., Cincinnati, Ohio  
 Clarke, Norman E., Detroit, Michigan  
 Cooney, James P., Ancon, Canal Zone  
 Cox, Seth L., Seattle, Washington  
 Crawford, Paul M., West Point, New York  
 Crawford, William G., Terre Haute, Indiana  
 Curtis, George M., Columbus, Ohio  
 Davignon, Alvah R., Albany, New York  
 Dayton, Theodore R., Wallingford, Connecticut  
 de Savitsch, Eugene, Washington, D C  
 Dimon, James W. W., Utica, New York  
 Duncan, Robert E., Washington, D C  
 Dunham, Royal W., Ottawa, Illinois  
 Farinas, Pedro L., Havana, Cuba  
 Fink, Ira, New York, New York  
 Foreman, Walter A., Brookville, Indiana  
 Forsee, James H., Washington, D C  
 Foster, John V., Jr., Harrisburg, Pennsylvania  
 Foucar, Frederick H., New York, New York  
 Franklin, Daniel, Fort Knox, Kentucky  
 Fredd, Harry, Brooklyn, New York  
 Freer, Arden, Washington, D C  
 Garcia, David E., Hato-Rey, Puerto Rico  
 Garcia-Rosell, Ovidio, Lima, Peru, S A  
 Gaynor, John S., Wheeling, West Virginia  
 Gelenger, Stephen M., Flint, Michigan  
 Godreau, Miguel F., Ponce, Puerto Rico  
 Gollnvaux, Cletus J., Monroe, Michigan  
 Goodrich, Benjamin E., Detroit, Michigan  
 Gordon, Douglas R., Newburgh, New York  
 Gorlin, Philip S., Richmond Hill, New York  
 Gould, Arthur A., Los Angeles, California  
 Grady, Henry W., Fort Benning, Georgia  
 Greene, Norbert S., Brecksville, Ohio  
 Grow, John B., Denver, Colorado  
 Hainlen, Edgar W., Mt Morris, New York  
 Hardaway, Robert M., Fort Bliss, Texas  
 Harrison, Harlon W., Shreveport, Louisiana  
 Hart, John C., Pearl Harbor, Hawaii  
 Hastings, De Forest R., Minneapolis, Minnesota  
 Heaton, Thomas G., Halifax, N S, Canada  
 Hellweg, Charles E., Chandler, Arizona  
 Heinrich, J., Fuhrman, New York, New York  
 Hellstrom, Lillian H., New York, New York  
 Hochberg, Lew A., Brooklyn, New York  
 Holcomb, Frederick W., Kingston, New York  
 Holmes, Arthur E., Lancaster, Pennsylvania  
 Howes, Willard B., Detroit, Michigan  
 Hurst, Allan, New York, New York

Iwanga, Barney N., Honolulu, Hawaii  
 Jacobson, Joseph J., Kingston, New York  
 Johnson, Hollis E., Nashville, Tennessee  
 Kanable, Holcombe R., Basin, Wyoming  
 Kastenbaum, Charles C., New York, New York  
 Keller, Paul E., Fort Douglas, Utah  
 Kelly, Virgil L., Beckley, West Virginia  
 Kenler, Maurice D., New Bedford, Massachusetts  
 Kiessling, Charles E., Newark, New Jersey  
 Kilpatrick, Elmer M., Columbus, Ohio  
 Kinsella, Thomas J., Minneapolis, Minnesota  
 Kinsey, Harold I., Toronto, Ontario, Canada  
 Klupt, Robert L., Brooklyn, New York  
 Kohl, Harold W., Tucson, Arizona  
 Kress, Milton B., Towson, Maryland  
 Laney, Ronald L., Marionville, Missouri  
 Lang, John G., New York, New York  
 Larson, Swen L., Elmira, New York  
 Ledbetter, Abbe A., Houston, Texas  
 Levin, Oscar S., Denver, Colorado  
 Lichtenberg, Walter, Fort Niagara, New York  
 Lingenfelter, Paul B., Clinton, Oklahoma  
 Liston, David E., Washington, D C  
 Loesch, John, Oneonta, New York  
 Lustok, Mischa J., El Paso, Texas  
 Lyght, Charles E., Northfield, Minnesota  
 MacInnis, Donald F., Pontiac, Michigan  
 Marcotte, Oliver, Detroit, Michigan  
 Marietta, Shelley U., Washington, D C  
 Mastellari, Amadeo V., Panama City, Rep of  
     Panama  
 Matturl, Dominick A., Jersey City, New Jersey  
 McClellan, Gustave L., Detroit, Michigan  
 McHugh, Michael J., Weston, Ontario, Canada  
 McSween, John C., Pensacola, Florida  
 Mehmert, Henry E., Chicago, Illinois  
 Miller, Arthur F., Kentville, Nova Scotia, Canada  
 Moore, Clarence E., Harrisburgh, Pennsylvania  
 Nimitz, Herman J., Cincinnati, Ohio  
 Nojlma, Kimi, Honolulu, Hawaii  
 Passalacqua, Luis A., Ponce, Puerto Rico  
 Pirkle, Hubert B., Rockville, Indiana  
 Pollard, Albert J., Harlingen, Texas  
 Pollock, William C., Denver, Colorado  
 Pou, Jaime F., Santurce, Puerto Rico  
 Pratt, Lawrence A., Atlanta, Georgia  
 Ramsay, Allan B., Springfield, Missouri  
 Reed, William A., Burton, Ohio  
 Rest, Arthur, Spivak, Colorado  
 Rlcan, Edgar, Washington, D C  
 Ringo, Hugh F., Montreal, Wisconsin  
 Risch, Otto C., New York, New York  
 Roberto, Romeo, Yonkers, New York  
 Roberts, Edwin H., Camp Forrest, Tennessee  
 Rodgers, William H., Philadelphia, Pa  
 Rosen, Charles S., St Louis, Missouri  
 Rosenbaum, Louis, New York, New York  
 Rosenblatt, Milton M., New York, New York  
 Samson, Paul C., Santa Barbara, California  
 Sayago, Gumersindo, Cordoba, Argentina, S A  
 Schrlre, Theodore, Capetown, South Africa  
 Schupmann, Martin A., Chicago, Illinois  
 Seellg, Charles A., New York, New York  
 Serra, Lawrence M., Baltimore, Maryland  
 Shaffer, Stanley N., Forest Hills, New York  
 Smith, Howard E., Austin, Texas  
 Smith, Leslie B., Weatherford, Texas  
 Smith, Wiley R., Knoxville, Tennessee  
 Spalding, William C., Fort Rosecrans, California  
 Sparer, Phineas J., Washington, D C  
 Spidel, Glenn P., Providence, Rhode Island  
 Stelman, Henry H., Buffalo, New York  
 Tempel, Carl W., Washington, D C  
 Thomas, Clarence S., Nashville, Tennessee  
 Thompson, Samuel A., New York, New York



Thompson, William L, Washington, D C  
 Vaccarezza, Oscar A, Buenos Aires, Argentina,  
 S A  
 Vaccarezza, Raul F, Buenos Aires, Argentina,  
 S A  
 Vaccarezza, Rodoifo A, Buenos Aires, Arg, S A  
 Van Deventer, William C, Long Beach, California  
 Wakeley, William E, East Orange, New Jersey  
 Waldron, George W, Houston, Texas  
 Wanninger, Horace, Richmond, Indiana  
 Watson, Allan R, Eureka, California  
 Wheeling, William S, Windber, Pennsylvania  
 Whiteman, Neville C, New York, New York  
 Wittich, Frederick W, Minneapolis, Minnesota  
 Wolf, John G, Pueblo, Colorado  
 Woodson, Turner A, Waverly Hills, Kentucky  
 Young, Charles T, Honolulu, Hawaii  
 Zizmor, Judah, New York, New York

## ASSOCIATES

Ackerman, Frederick F, Fort Douglas, Utah  
 Agar, John S, Little Rock, Arkansas  
 Alley, Franklin H, Oakville, Tennessee  
 Ayers, Lloyd R, Kelly Field, Texas  
 Bagby, Bathurst B, Brook Hill, Virginia  
 Beelman, Floyd C, Topeka, Kansas  
 Beloff, Harry, Philadelphia, Pennsylvania  
 Boiker, Abraham, Brooklyn, New York  
 Borchardt, Paul R, New York, New York  
 Bowers, George S, Denver, Colorado  
 Brotman, David M, Chicago, Illinois  
 Brown, Florence A, Portland, Oregon  
 Bruhi, Charles K, St Louis, Missouri  
 Caldwell, David M, Pittsburgh, Pennsylvania  
 Campos, Teodosio V, Havana, Cuba  
 Carter, Arthur C, South Dartmouth, Mass  
 Centranolo, Antonio A, Buenos Aires, Arg, S A  
 Challen, Alice A, Buffalo, New York  
 Chang, M Leon, Hilo, Hawaii  
 Chernoff, Arthur H, Camp Edwards, Mass  
 Chett, Nicholas J, Shoemakersville, Pa  
 Childs, Edgar S, Honolulu, Hawaii  
 Cohen, Samuel C, Milton, Mass  
 Cohen, Seymour J, Chicago, Illinois  
 Combs, Stuart R, Terre Haute, Indiana  
 Conlogue, Everett F, Oakville, Tennessee  
 Cooper, Franklin B, Oakmont, Pennsylvania  
 Cooper, James R, Richmond, Indiana  
 Davis, Paul V, Bridgton, Maine  
 de Bustamante, Orifillo Suarez, Havana, Cuba  
 de Guevera, Alberto Ladron, Guadalajara, Jalisco,  
 Mexico  
 del Arco, J Gonzalo Freile Nunez, Guayaquil,  
 Ecuador, S-A  
 de Lorimer, Alfred A, Washington, D C  
 Diamond, Sidney, Jamaica, New York  
 Donaldson, James M Jr, Dallas, Texas  
 Dorner, Ralph A, Iowa City, Iowa  
 Ellmers, Basil J, New Milford, New Jersey  
 Evander, Leonard C, Lockport, New York  
 Fitzgerald, Joseph M, New York, New York  
 Friedman, Bernard, Koch, Missouri  
 Frohman, I Phillips, Washington D C  
 Gerson, Charles E, Fort Leonard Wood, Missouri  
 Gonzalo, Pedro H, Havana, Cuba  
 Gordon, Nathan G, Fort Barrancas, Florida  
 Gray, William P, Batesville, Arkansas  
 Hanahan, Ralph B, Camp Stewart, Georgia  
 Harrat, Frank T Jr, Hempstead, New York  
 Harrington, Arthur J, Baldwin, Long Island N Y  
 Harrington, Peter F, Providence, Rhode Island  
 Hiebert, Homer L, Ah-Gwah-Ching, Minnesota  
 Hodil, Elmer R, Allenwood, Pennsylvania  
 Idstrom, Linneus G, Ah-Gwah-Ching, Minnesota  
 Iturbide, Enrique C, Guatemala City, Rep of  
 Guatemala, Central America  
 Jones, Thomas R, Houston, Texas  
 Jurgens, George H, Wauwatosa, Wisconsin  
 Kaplan, Albert, St Louis, Missouri  
 Katz, Sidney, Cleveland, Ohio

Kimball, Arthur S, Pontiac, Michigan  
 King, Richard, Memphis, Tennessee  
 Kirby, Edwin G, San Diego, California  
 La Fratta, Carl W, Richmond, Virginia  
 Leaman, Granville M, East Orange, New Jersey  
 Liblen, Benjamin H, Minneapolis, Minnesota  
 Lipstein, Samuel, Liberty, New York  
 Lorge, Heinz J, Rutland, Mass  
 Madsen, Henry V, Rockville, Indiana  
 Martin, Eleanor, New Rochelle, New York  
 McCracken, Robert L, Nashville, Tennessee  
 McShane, Patrick I, Denver, Colorado  
 Miller, Samuel E, Camp Shelby, Mississippi  
 Moore, Bert E, Mauston, Wisconsin  
 Moran, James B, Camp Blanding, Florida  
 Munro, Howard F, Freeport, New York  
 Nathan, David A, Miami Beach, Florida  
 Oppenheim, Heinz, Brecksville, Ohio  
 Palacio, Nathan, Buenos Aires, Arg, S A  
 Philips, Rowland S, Glenn Dale, Maryland  
 Pierce, Glenroy N, French Camp, California  
 Placak, Joseph C, Jr, Cleveland, Ohio  
 Price, Henkel M, Martinsville, Virginia  
 Reiss, Jack, Indianapolis, Indiana  
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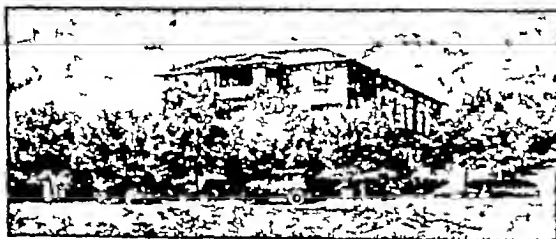
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## CONTENTS:

THE PRESENT DAY PROBLEM IN TUBERCULOSIS (Page 229)

Benjamin Goldberg M.D., Chicago Illinois

AMBULATORY COLLAPSE THERAPY OF PULMONARY  
TUBERCULOSIS (Page 232)

Minas Joannides, M.D. Chicago, Illinois

SOME POINTS ON TUBERCULOSIS FOR THE GENERAL  
PRACTITIONER (Page 237)

Donald B. Chisholm M.D., Kealia Kauai Hawaii

THE DETECTION OF EARLY TUBERCULOSIS IN  
DETROIT (Page 244)

D. S. Brachmann M.D. Detroit, Michigan

INFORMATION PLEASE —A Quiz on Diseases of the Chest (Page 248)

Benjamin Goldberg M.D. Chicago Illinois,  
George G. Ornstein M.D. New York, N. Y.  
Champ H. Holmes M.D. Atlanta Georgia  
Richard H. Overholt M.D. Brookline Mass.  
Ralph C. Matson M.D. Portland Oregon  
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<sup>1</sup>COLEBATCH, J. H. (Royal Melbourne Hosp.) Med. J. Australia 28:640 (Dec. 6) 1941

<sup>2</sup>BARODICK, P. H. Northwest Med. 41:193 (June) 1942

<sup>3</sup>FRIEDMAN, B. and KELLY, F. C. Arch. Ophth. 27:728 (April) 1942

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## The Present Day Problem in Tuberculosis\*

BENJAMIN GOLDBERG, M.D. \*\*

*Chicago, Illinois*

The "Captain of Men of Death" is not Mars. Injury, mutilation and destruction in war has not been the first and single greatest cause of death among humans. While war takes an immense toll of lives in the course of its many battles, this toll of lives has never equalled in the long annals of history the record toll of one disease, Tuberculosis, and to Tuberculosis the appellation "Captain of Men of Death," as yet, applies throughout the world. The present estimate as to the total population of the world is 2,200,000,000. While only an approximate estimate can be made of the tuberculosis mortality throughout the world because statistical data are not available from great areas with immense populations such as China, India and even Russia, figures, however, have been obtainable from most of Europe and America. Taking our knowledge of group studies in death rates, one can conservatively apply an average present mortality in tuberculosis of 90 per 100,000 population. This would indicate that at this time there are approximately 2,000,000 deaths annually from this cause alone. If we look further and see the picture on the basis of an entire lifetime, one realizes

that at least 8 per cent at a minimum of all deaths are due to tuberculosis. Therefore, among those alive in the world at this time, it is entirely likely that anywhere from 175,000,000 to 200,000,000 will perish from the inroads of tubercle bacilli.

But war and the consequences of war have always caused an increase in the morbidity and the mortality from phthisis.

During World War Number I, the definite downtrend in tuberculosis mortality in the European countries was immediately halted. This was attributed to a marked congestion in urban centers, physical and nervous fatigue, inadequate housing and a depletion of food reserves. Intimacy of contact allowed for greater infection dissemination, and failure of constitutional resistance allowed increased disease development.

Mortalities doubled and trebled in various European cities, but these high rates again resumed the normal trend with the resumption of normal industry and living conditions. In the present war, the only comparative statistics for the past three years are these from England, Wales and Scotland, where an increase of more than 15 per cent in tuberculosis mortality is noted for 1941 over 1939.

In London, the increase is more marked. There in 1939 the rate was reported at 78 and in 1940 at 97 per 100,000 population. In

\* President's Address, American College of Chest Physicians, Eighth Annual Meeting Atlantic City, June 6-8 1942

\*\* Associate Professor of Medicine at the University of Illinois College of Medicine

Glasgow the deaths numbered 972 in 1939, 1177 in 1940, and in 1941 they were estimated to reach 1342

In France, reports from some of the larger centers indicate an increase in tuberculosis mortality in the first six months of 1941 over 1939 of approximately 30 per cent

Studying the tuberculosis trends in this country, at the turn of this century the death rate was over 200 per 100,000. In the past year, 1941, it had decreased to an all-time low of under 45

In comparison, we should not forget that there are other countries where tuberculosis death rates continue to range between two hundred and five hundred per one hundred thousand at this time. We must also remember that only two decades ago, the age group of 21 years and over showed evidence of tuberculous infection in at least 95 per cent of the inhabitants of this country, as determined by tuberculin sensitization tests, and that today only about 50 per cent of this same age group evidence such infection

The victims of tuberculosis are found in greatest numbers between the ages of 15 and 35, in which age groups this disease still is the first cause of death in these United States. Under the present emergency where it is of paramount importance to maintain health and vigor for physical and mental efficiency on the combat line or in the increased needs of production in industry, more careful attention must be given to the control and continued eradication of this killer

If we were to list the most important factors in the achievement of the low mortality attained in this country, we would have to present the following three considerations

- 1) The detection of the tuberculous individual, having a positive sputum and controlling that individual, or the disease which he has, so that he is not capable of further infection spread

- 2) The building and development of many institutions where such individuals might be housed and treated to prevent infection spread

- 3) The work of the veterinarian in eradicating tuberculosis in cattle has resulted in the fact that less than one-half of one per cent of cattle housed for dairy purposes in this country show evidence of tuberculosis. Thus, the almost complete absence of tubercle

bacilli in this important article of food has resulted in nearly a complete disappearance of the nonpulmonary forms of this disease

We should also appreciate the improvement noted in the constitutional resistance of individuals in this country, which has resulted from the following factors

- 1) An improved knowledge of dietetic habits, particularly as they refer to the basic food components, proteins, fats and carbohydrates, and our augmented knowledge and use of vitamins and mineral salts

- 2) Recognition of the importance of adequate and proper housing

- 3) A better realization of the necessity for avoiding mental and physical fatigue, and the importance of a happy outlook

Tuberculosis in the aged today is frequently mentioned as a problem. I have mentioned the lessening incidence of infection in our youth, but we also see many reports concerning the frequency of tuberculosis in those above fifty years of age. We must not forget that the age group of fifty years and over belonged to the youth of those years when tuberculous infection was manifested in every inhabitant of our country. We should also remember that with increased longevity at this time, sixty-two years being the average in this country, new pathological entities occupy the forefront of the mortality tables. Leading the procession today are heart disease, blood vessel and kidney conditions, diabetes, and other metabolic states which call for dietetic alterations—allowing a dormant tubercle to become active in an altered tissue chemistry and tissue reactivity

Today, with our country compelled to enter into a state of war, the requirements are for an all-out production effort, causing shifting of masses of population, not only into the armed forces of the country, but into urban centers, where industry necessary to war has been extended to two, three, or four times the previous capacity in space and men. This to meet the needs of the emergency. National leaders, appreciating the importance of preventing physical fatigue, of supplying dietaries which are adequate, and also, in attempting to make certain that a sufficiency of housing will also not be neglected, are considering in these preparations the maintenance of the health of our nation. If these conditions are not allowed to obtain, there

is no question but that among the fifty per cent of individuals showing evidence of tuberculous infection in this country, we must allow for the development of much tuberculous disease

The important considerations that today exist in a further control of this disease, and, perhaps its ultimate eradication, may be listed as follows

1) *Case Finding*—It is still most important that we discover all of the tuberculosis cases present in this country, and as we have so often reiterated in previous writings, both in the armed services and in industry Especially should a survey be maintained to discover early disease, and prevent its spread The simplest procedure is utilization of tuberculin tests and chest roentgen films in cases with positive reactions When the tuberculin is potent and a satisfactory dosage is used and properly applied intradermally, very few false negative reactions are seen, and these all have a definite basis which can be determined The x-ray film of the chest, when properly taken and interpreted, will delineate with a greater degree of accuracy the presence and extent of lung pathology than any other method we have at our disposal

2) *Prevention by Vaccination*—Vaccination by inoculation has interested tuberculosis research workers for years At first, dead bacilli were used, later live virulent organisms, such as B C G, the *Bacillus Calmette-Guerin* We must remember that bodies or substances immune to tuberculous infection or disease have never been demonstrated, that the only supposed protective mechanism is the specific sensitization to tuberculous infection implanted, intentionally, or accidentally, in the human host That, also, the causation of disease, where such sensitization has occurred in the presence of re-infection or secondary infection, is dependent on the degree of sensitization and the number and virulence of the secondary infecting tubercle bacilli This allows for either the localization of these new invading organisms and their subsidence or the occurrence of serious destructive lesions Inasmuch as sensitization cannot be made constant, the number and virulence of the secondary infection tubercle bacilli, which are accidentally met on the highways of life, cannot be determined,

and inasmuch as we have not as yet seen nor heard of any evidence that could point to the limitation of sensitization through inoculation by vaccination, which might guarantee definite localization of disease when re-infection takes place, we have refrained from recommending this method of tuberculosis prevention

3) *Specific Therapy*—Chemotherapy in tuberculosis has received more impetus lately in an attempt at achieving the destruction of the tubercle bacillus, in vivo, without destruction of the body tissue cells in and surrounding the disease area Jaffé has shown that only "in very few instances do blood vessels penetrate tubercle," and, therefore, with bloods vessels thrombosed in the periphery of areas of tuberculous pathology, direct action upon the bacilli in the caseous centers through the application of chemicals has limited possibilities

The thought engendered in the utilization of bactericidal substances in chemotherapy is based on their combination with aniline dyes in the hope that a chemotactic cellular affinity for such dyes would take place and allow bacillary destruction In recent months, there is an ever-brightening possibility of this latter occurrence The sulfonamide group of chemicals has proven to be what is probably the single greatest discovery in combatting infection in the human body One of this group, promin, has in animal experimentation demonstrated ability to diminish the number of viable tubercle bacilli in the blood stream and also to delay and prevent tubercle caseation This experimentation, however, is in animals who were given promin immediately before, during and after inoculation with a virulent strain of tubercle bacilli There is still doubt as to how this chemical or any allied chemical combination will act where tuberculous disease of the caseous pneumonic type has already been established and vascularity in the disease area has been stopped at the margins of pathological change It is, however, to be hoped that definite benefits will accrue If the eradication of tuberculous infection is possible through such means, this will leave only the alterations in tissue structure, which have occurred consequent on the presence of tuberculous infection prior to its eradication, to correct

4) Continuance of our present methods of management in the presence of active disease

a) There should be continuation in the supervision of the tuberculous, which requires that all cases be reported to the public health authorities

b) Persistence in the usual therapeutic regime of rest, diet which is well balanced as to proteins, fats, carbohydrates, mineral salts and vitamins, and fresh air

c) Surgical collapse procedures Artificial pneumothorax continues to stand out as the single most effective method of collapse therapy and should be used in every instance where parenchymal destruction is evident. Its application can be made more extensively in association with intrapleural pneumonolysis when adhesions prevent an adequate collapse. The development of many new selective and local surgical collapse procedures has allowed for a lessening of the number of

complete thoracoplasties, but the latter procedure, when indicated, is as yet an important life-saving operative procedure and should not be left as a last resort. Local methods to aid in cavity collapse are extrapleural packs, paraffin rubber, tissue-substance as fascia, extrapleural pneumothorax, the Monaldi cavity aspiration, and partial or complete thoracoplasty.

Finally, I would remind you that this is a war of efficiency. A war of ingenious invention for destruction. Yet, it can only be a victorious war when the machinery developed to fight is controlled by hands of human beings who are physically and mentally fit to fight. The task of maintaining this fitness is in the hands of the medical profession. It must direct industry, labor and the armed services in setting up those safeguards which will maintain the physical needs to achieve that victory.

## Ambulatory Collapse Therapy of Pulmonary Tuberculosis

### Sanatorium Care versus Care by Private Physician

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Rest is the fundamental basis of therapy in pulmonary tuberculosis. First promulgated in America by Trudeau, this principle has become the credo of phthisiologists and sanatorium attendants. Varying degrees of bodily rest, from absolute bed rest to partial exercise and eventually to limited rest periods, have been advised on the basis of the degree of toxicity present in the tuberculous patient. Bodily rest is of great advantage, but its value may be enhanced with local splinting of the lung by establishing artificial pneumothorax or some other form of collapse therapy in suitable cases. In this way the diseased lung is given a chance to rest by limiting its expansibility from 10 per cent to 90 per cent. Collapse therapy also provides a means for promoting closure of tuberculous cavities, thus preventing an accumulation of sputum which may become the

source of infection for other parts of the lung, or persons in contact with the patient. The splinting of the lung likewise reduces the absorption of toxic lymph from the tuberculous focus through the lymphatics, thus reducing the tendency to toxic manifestations such as fever, sweating, tiredness and loss of weight.

Rest is best provided for in a tuberculosis sanatorium but the sanatorium is not available to all tuberculous patients. Of those who can pay for private care, the sanatorium becomes a definite burden because of prolonged stay. There is a limited maximum number of sanatorium beds available so that those who are unfortunate enough to be on the waiting list generally have nothing done for them except a periodic visit by the clinic nurse and a periodic visit to the clinic where, in most cases, a superficial examination is done and a cough syrup prescribed. Some patients may receive cod-liver oil and others

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may be given the advantages of collapse therapy. Such patients necessarily become public charges because all tuberculosis activity is generally centered around municipal or county institutions maintained by taxes. As soon as a patient is discovered to be tuberculous and his case is reported to the health authorities, the patient is continuously annoyed by the clinic nurses, and time after time drop the gentle hint that the patient need not pay a private physician for medical care that he may come to the local tuberculosis dispensary after dismissing his doctor. There are two alternatives left for the private physician interested in treating tuberculous patients. He either drops the matter entirely and has nothing to do with tuberculous patients or he treats such patients and does not report them in order to save himself the interference of the public health nurse who is trained to use every possible means of increasing the registration list of her local clinic.

Home care of tuberculous patients is the solution to the tuberculosis problem in many communities. Because lack of bed space in the local sanatoria it becomes obvious that there is no alternative. The patient must stay at home while waiting admission to the sanatorium. Such being the case, why not treat this patient in his home and carry out the necessary isolation and treatment in the home? Furthermore, why not train the local doctor to recognize and treat such patients during the course of his practice? If the local physician is incompetent to treat tuberculosis he should be trained by the local health authorities through lectures, demonstrations, and proper guidance in the care of the particular patient. Such a patient should remain under the supervision of the local doctor. Both the patient and the doctor will profit by such contact.

Collapse therapy may be instituted in the patient's home or the local hospital by referring the patient to one in the community qualified to do such work. Private physicians' care given to such patients enhances the possibilities of greater personal contact between the physician and patient and does not tend to pauperize the patient. Patients who are unable to pay regular fees should be charged accordingly and those who cannot pay should be subsidized by the payment of a nominal

fee from municipal or county funds laid aside for the care of such patients. If such patients were hospitalized in the sanatorium it would cost the local authorities from 2 to 5 dollars per day for such care. By subsidizing local tuberculosis specialists for the care of such patients the expenditure of public funds would be proportionately very small. In this way the clinic load would become lessened and a greater co-operation between private practitioner and local tuberculosis authority would be effected. An arrangement for local care of indigent patients by the tuberculosis specialist can be made by the local tuberculosis authority through proper qualifying examinations and official appointment for such work. Such work should be distributed so that only a certain maximum of patients be cared for each day, thus enhancing personal contact between doctor and patient and avoiding long waiting and delay for treatment.

Until a more effective form of therapy is developed and until sufficient institutional bed space is provided for all toxic tuberculous patients and all negligent patients, collapse therapy on ambulant patients and home care of toxic patients, will offer the greatest chance of recovery. Artificial pneumothorax is by far the simplest and safest form of collapse therapy. It can easily be carried out in the patient's home, the doctor's office, or the outpatient department of a hospital or sanatorium. After the use of this form of therapy on a large scale for ten years, we are convinced that even the induction of pneumothorax collapse does not require hospitalization. The maintenance of artificial pneumothorax is quite simple and can safely be carried out on ambulant patients.

It is obvious that a certain number of patients will present definite complications, such as adherent pleuritis, effusion, spontaneous pneumothorax, and some will come for care at a time when their lesion is too extensive to warrant the use of pulmonary collapse. However, the larger bulk of patients that generally come to the attention of the phthisiologist have few, if any, contraindications for collapse. It is this type of non-toxic patient that can be made useful to himself and to the community by giving him ambulatory therapy while he is being rehabilitated physically and economically to become a produc-

tive member of the community

Home care of toxic patients is an inevitable necessity because of lack of bed space in various communities as compared with the number of cases known to have tuberculosis. Home care should be just as effective as sanatorium care if the attending physician will properly isolate the patient from contacts. A patient who is cognizant of the fact that he is a carrier and who lives with persons who also are cognizant of the possibility of spread of the disease, should be just as safe at home as in the sanatorium. It is the duty of the attending physician to instruct the patient and the contacts regarding the dangers of spread of the disease and supervise isolation of the patient in the home.

Unfortunately, among patients and contacts one finds two extremes, namely, phthisiophobia on one hand, and complete apathy and negligence on the other. The over-concerned patient may be treated psychically to affect a peace of mind. This can be done easily by the local physician in whom the patient has placed his faith and trust. The neglectful patient can be advised, watched, and warned, and if still neglectful, he should be properly isolated by forcible hospitalization in a sanatorium until his sputum becomes negative for tubercle bacilli. It is the latter type of case for whom the sanatorium is an absolute necessity for the sake of himself and the community.

Phthisiophobia among contacts is quite a serious problem. Unfortunately, it exists even among doctors and nurses. The fear of developing tuberculosis is so exaggerated in the minds of certain contacts that they make every possible effort to get rid of the patient by sending him to a sanatorium or the West. It is unfortunate that such a phobia exists because the patient is denied all opportunity for proper care. He becomes an outcast and his relations with his contacts become strained. After all, a tuberculous patient is no more dangerous than a case of pneumonia or other infectious disease if properly isolated. Such a fear has even permeated into a number of hospitals so that tuberculous patients are refused admission. A patient may be perfectly welcome in a hospital and be treated humanely until a diagnosis of pulmonary tuberculosis is established. From that moment on the patient is ostrac-

cised and looked upon as a dangerous untouchable. A hospital is generally the training school for nurses and resident physicians. The care of such tuberculous patients should be considered an opportunity to train doctors and nurses in the technic of isolation and care of these patients. Thus innocent and unknown exposure to tuberculous patients will never be harmful to these persons, who are trained in isolation technic.

The sanatorium offers the ideal environment and conditions for the care of the tuberculous. It prevents close contact between an open case and his friends and relatives. It offers an environment where the patient learns about rest, hygiene, and proper habits. It gives the patient a chance to stay in an airy, well-ventilated place. It gives the patient a chance to eat the proper kind of food, a balanced diet. In spite of the advantages enumerated, the sanatorium is available only to a small percentage of those who need it and there is little likelihood that enough beds will become available to accommodate all the patients with active tuberculosis. In the Chicago area there are only about 3000 beds available for a total of about 15,000 known cases of pulmonary tuberculosis. More beds may become available if arrangements can be made in general hospitals to care for the tuberculous under proper isolation technic. Such isolation need not be very rigid and no special building or special wing of a hospital is necessary. Private rooms can be used for those that can afford such an expense, or the use of small wards can be arranged for, when enough tuberculous patients avail themselves of the benefits offered by the general hospital. The patient with a diagnosis of pulmonary tuberculosis is no more dangerous than a patient with pneumonia, or pelvic cellulitis. One type of patient should be just as acceptable as the other, as long as proper precautions for isolation are enforced.

The fear of cross infection from a tuberculous patient, either to other patients or to nurses, is grossly exaggerated. It becomes therefore, a problem as to what to do with such patients. These patients must be cared for adequately, the contacts must be watched and everything should be done to prevent the patients from becoming dangerous carriers. They should be in the hands of com-

petent doctors who are trained in the diagnosis and care of tuberculosis. The special training required of the phthisiologist and chest surgeon must become available for all such patients. Unfortunately, in our experience, when a diagnosis of tuberculosis is made on a patient, everyone concerned in the case, including the attending physician, looks forward to getting rid of the patient by dumping him off into a sanatorium. Some hospital administrators are so frightened by the thought of having a tuberculous patient in their institution that they are apt to discharge the patient from their hospital even when this patient is in extremis. Such an incident occurred with a patient who developed a pulmonary hemorrhage while in the hospital. A diagnosis of pulmonary tuberculosis was made. In spite of the acute hemorrhage and the danger of moving such a patient from one institution to another, the superintendent of the hospital insisted on discharging this patient from the hospital. The attending physician, who was not a phthisiologist, was in a quandary and called me. The patient was transferred to my service at the Alexian Brothers Hospital, artificial pneumothorax was instituted, the hemorrhage was controlled and the patient finally made a full recovery.

It is sad to realize that such a condition exists in this day when we are proudly eulogizing our great advances in the control of tuberculosis. The patient with the pulmonary hemorrhage should have been given all the advantages that the hospital could offer. It should have been welcomed as an opportunity for the nurses and house staff to take care of such a patient in whom recovery is really dramatic. What was done at the Alexian Brothers Hospital could easily have been done in the other hospital, to the advantage of all parties concerned.

The mere fact that a patient has tuberculosis should not make him an outcast so that he must be isolated from his friends and relatives by being committed to a tuberculosis sanatorium. He should be treated adequately in the home or in the doctor's office. He should be placed under the care of a physician who is qualified to treat tuberculosis and who will co-operate with the family physician.

In Chicago the problem of inadequate bed

space and proper care has been handled, in the last ten years, by the introduction of ambulatory collapse therapy. Up to May 2, 1940, there have come under my supervision 9,246 patients, to whom a total of 174,917 pneumothorax treatments were given. We have seen patients with early lesions get well promptly and we have tried hard to assist those in the more advanced stages of the disease. We are thoroughly convinced that as many as 80 per cent of the cases will improve with artificial pneumothorax, if the patients are started early and are also given the benefits of rest, balanced diet, and the proper vitamin intake. When the patients present themselves for treatment in the more advanced stages of the disease the chances for recovery become diminished in proportion to the extent and type of pathology and the degree of toxicity of the patient.

Toxic patients, being strictly bed patients, should be the ones to be given preference for admission to the sanatorium. If sanatorium care is not available, these patients should be cared for at home or in a general hospital. Such patients will prove excellent material for training of student nurses and internes, in the technic of isolation and prevention of cross infection to themselves and other patients. Collapse therapy should be considered in all patients and tried in all cases that do not present contraindications to this type of treatment.

Non-toxic patients can have artificial pneumothorax induced and maintained in the doctor's office, in the patient's home, or in the hospital. Refills in non-toxic patients can be safely carried out in the doctor's office with fluorescent screen check-up of the degree of collapse and the pulmonary response to the treatment. Ancillary treatments, with calcium, gold or other drugs can be easily carried out on an ambulatory basis. Check-up of the bodily response to these treatments may be easily done in the doctor's office or the local clinical laboratory.

Complications arising during the course of refills on ambulant patients can generally be taken care of in the doctor's office or the local hospital. It is quite simple and safe in office practice to aspirate effusions, to induce oleothorax, or to irrigate pleural cavities. In offices where the doctor does not have the proper facilities, he can easily arrange

for such service in the outpatient department of his local hospital. Effusions can be reduced to a minimum when proper attention is given to the efficiency of the circulation of the patient, the elements of asepsis, and the response of the heart and lungs to sudden change of intrapleural pressure. In the last nine years, out of 9,246 registrations, we have encountered 806 cases of effusion, or 8.7 per cent of all patients under treatment.

Adherent pleuritis is a complication which may prove annoying and dangerous. In spite of careful technic, a puncture of the lung with resultant traumatic pneumothorax may result. Out of 88 cases of traumatic pneumothorax, occurring in 10 years, 82 recovered and 6 proved fatal. Air embolism may also result in cases with an adherent pleuritis. During this period we encountered air embolism in 39 cases, 29 of whom recovered.

These complications cannot be held as an argument against ambulatory care because they can occur just as well in the sanatorium as in the clinic, the general hospital or the doctor's office.

Phrenic nerve paralysis, extrapleural pneumolysis with subsequent extrapleural pneumothorax, and thoracoplasty can easily be done in a general hospital. The patient has only to stay in the hospital long enough to recover from the acute effects of the operative procedure. Subsequent care and observation may be carried out in the patient's home or the doctor's office.

Home care of tuberculous patients, as compared with sanatorium care, has certain advantages and disadvantages. The following advantages may be considered. The patient is in an environment he has been used to and does not have to make an effort to readjust himself to a new environment. The patient can eat the foods of his own choice and garnished in accordance with his own likes and dislikes. The patient is not in contact with routine sanatorium gossip regarding the progress or morbidity in other patients and in this way he may have peace of mind. The doctor who sees the patient in the home is bound to take a little more personal interest in the problems arising during the intervals between visits, because he has less to do than the sanatorium doctor who makes rounds daily and merely looks in and

gives routine orders. At home the physician will be likely to examine the patient more carefully at every visit and as often as he presents new findings. The attitude of the patient towards his own condition is influenced favorably by contact with problems relating to his home and relatives, and this enhances his desire to get well. The cost of maintenance of the patient in a sanatorium is diminished or entirely eliminated. If the patient is in a private sanatorium, there is a constant drain on the family treasury of \$25 to \$50 per week in addition to incidental expenses. This, of course, is over and above the current expenses for the upkeep of the home. If the patient is in a tax-maintained or endowed sanatorium, the expense is a minimum of \$2.00 per day and may exceed \$10.00 in some cases. With home care the patient is likely to become rehabilitated earlier by weeks or months, because the changes in the condition of the patient become obvious during the periodic careful examinations. By caring for the patient, the contacts become educated in the prevention of cross infection, and also in the value of developing a resistance against the disease.

Among the disadvantages of home care and advantages of sanatorium care the following may be considered. The possibility of tuberculous infection among careless and unscrupulous patients and contacts. Home conditions at times, due to certain incompatibilities and maladjustment, are not satisfactory enough to be conducive to improvement. Poverty may be a sufficient factor to prevent the purchase of food for a balanced diet, and of such medication as is necessary. In such cases the patient may not have an opportunity to avail himself of the services of a chest specialist and thus is neglected. Indigent toxic patients will not be able to enjoy the benefits of good nursing supervision and periodic laboratory checks as to the progress of the pathology.

#### *Summary*

This paper is a plea for the emancipation of the tuberculous patient. As soon as he is labeled tuberculous the patient should not become an outcast, regardless of his station in life. He should be given all the benefits of modern care and be saved from pauperization. The care of such patients should be

entrusted to properly qualified private physicians in order that the patient may not become just another case but may be treated as an individual. Private care by properly qualified physicians will aid the patient in keeping his own identity as a member of his local community, avoid his becoming a pauper, and assist in his early rehabilitation physically and socially. All this can be brought about by encouraging and training the private physician to look for cases of pulmonary tuberculosis and properly take care of them. The family and physician can work in close cooperation with the chest specialist so that the patient may not be neglected at any time. By special arrangement with the tuberculosis authority in the local community indigent ambulatory patients may be treated in the office of the chest specialist and bed patients be treated at home or in the local general

hospital at a cost much lower than that of maintaining a large sanatorium. The sanatorium should be restricted especially to negligent open cases who are dangerous to their contacts and also to toxic bed patients who do not have the necessary facilities at home for proper care. Tuberculosis should not become synonymous with pauperization and socialized medicine. With proper training the general practitioner, the hospital administrator and his resident staff can be made tuberculosis conscious so that the disease can be more easily detected and proper humane isolation be established. Tuberculosis will always be a problem and should concern not only the few specially trained persons, but all who are interested in treating human illness.

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## Some Points on Tuberculosis for the General Practitioner

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In all phases of medicine the specialist is constantly encountering the errors and misconceptions of fellow physicians possessed of less detailed knowledge. Experience with such instances has been the stimulus for this paper. The subjects to be considered concern the private physician and his knowledge of tuberculosis, evaluation of the stethoscope, evaluation of the x-ray, evaluation of "primary" pleural effusion, the nature and evaluation of the tuberculin test, the collection of sputum, the relativeness of "negative" sputum, and the induction of artificial pneumothorax by the private physician.

*The Private Physician and His Knowledge of Tuberculosis*—As a rule it is difficult to arouse the general practitioner to a sustained interest in tuberculosis, and it is difficult, therefore, to get him to keep abreast of the subject. Patients with tuberculosis are usually referred to sanatoria. They thus contribute a very small part to the average physician's income. This does not necessarily imply that such physicians are mercenary. The field of general practice is an enormous

one, and the physician cannot be condemned for neglecting the study of a disease he rarely if ever treats.

Another major factor promoting lack of interest in tuberculosis, and therefore lack of knowledge in tuberculosis, is the prevalence of a wholly unjustified, fatalistic pessimism toward prognosis in the disease. This in itself is based on a lack of knowledge as to how aggressively the disease is being subjected to active therapeutic measures in the modern sanatorium. The prognosis for minimal and even moderately advanced cases is, in general, exceedingly hopeful.

Despite seemingly justifiable reasons for a lack of interest in tuberculosis, the general practitioner has much to gain by being familiar with the modern treatment of the disease and with the very favorable results thereof. Without such familiarity he cannot have the optimism which is so often needed to mitigate the patient's first reaction to the diagnosis of tuberculosis. Nor can he have the persuasive arguments which will give his advice the power of conviction.

when the patient first objects, as he nearly always will, to going to a sanatorium. Nor can he know what his patients will think of him after their sanatorium sojourn.

The advice and encouragement which the private physician gives to his patient after diagnosing tuberculosis will not only have a paramount influence on the attitude and cooperation of that patient in the sanatorium, but will also determine whether or not the patient will willingly return to the supervision of his private physician when discharged from institutional care. There are few patients who, after some weeks in a modern sanatorium, are not able to make a shrewd guess as to how much their referring private physician knows about tuberculosis. After several months on a sanatorium regime, the patient usually has a very decided opinion as to whether he does or does not want to return to the supervision of his private physician on discharge. Every sanatorium physician is put on the spot numerous times a year when patients consult him in regard to this issue. It is a matter of pleasure and relief for the sanatorium physician to be able to refer his discharged patients back to a physician whose judgment is respected.

The diagnosis of tuberculosis is pre-eminently a field of the general practitioner. The latter should be an expert on all phases of the diagnosis of the disease. Likewise, although he cannot reasonably be expected to follow all the current literature on tuberculosis, he should have a reading acquaintance with the chapters on treatment in the better monographs on the subject.

Next to diagnosis, as a rule the private physician's most important service to his tuberculosis patient is the periodic check-up following arrest of the disease. These periodic check-ups should be continued for years, perhaps for life. Time intervals will depend on the individual case. A short bit of advice may here be given in respect to the periodic check-up. Always take an x-ray. It is the only way to be sure. Any other method is a guess. The fluoroscope, particularly, should not be relied upon either for early diagnosis or for follow-up examinations. Fluoroscopy, even in the hands of experts, misses too many early cases and too many early reactivations.

*The Stethoscope*—Many physicians have an exaggerated idea of the value of the stetho-

scope. This idea may relate to a childhood awe of the family physician and his "telephone," but it is more likely the reaction of personal humility to pedagogic reconditeness encountered in medical student days. At all events, exaggeration of the value of the stethoscope, particularly in the detection or elimination of tuberculosis, has led to countless tragedies. Every tuberculosis specialist and resident is familiar with scores of histories in which patients with well advanced long-standing disease have stated that their physician examined them with the stethoscope one to six months previously and pronounced them sound. It may be protested by the initiated that, had the physician known how to use his stethoscope, the tragedy would not have occurred. Admitting that the value of auscultation varies with skill, such a protest is chauvinistic to say the least. The stethoscope has inherent diagnostic limitations, and those most familiar with diseases of the chest know that these limitations are by no means restricted to early or minimal cases of tuberculosis. The Subcommittee on Case-finding Procedures in Tuberculosis of the American Public Health Association has come to the conclusion that minimal cases of tuberculosis are almost invariably missed on examination by percussion and the stethoscope.<sup>1</sup>

The stethoscope had a justly hallowed reputation up to the time of the clinical application of x-rays. The latter, however, have given us a new evaluation of the stethoscope in which unjustified confidence has been tempered by a timely skepticism. In the diagnosis of early, i.e., eminently treatable, tuberculosis, the stethoscope is most effectively evaluated as a crude, inefficient instrument. The general acceptance of this, to some, heretical fact will save thousands of lives annually. All tuberculosis case-finding authorities are agreed that the general practitioner is, or should be, the most important case-finding agent. This being so, it is imperative that the physician at large should keenly appreciate that, while his stethoscope may tell him no lies when signs are audible, it often fails to tell him the truth when signs are inaudible.

*The X-ray*—Technically, the finding of tubercle bacilli in the sputum offers the only method of absolutely proving the diagnosis

of pulmonary tuberculosis. However, a great many cases of active tuberculosis have negative sputums, and such cases will often be missed if not x-rayed.

In the diagnosis of tuberculosis the x-ray takes precedence over the sputum examination because, if the latter is negative, disease may still be revealed by the x-ray, while if the sputum is positive, an x-ray must be taken to learn the nature and extent of the lesion. Information given by the x-ray is the absolute *sine qua non* on which the modern treatment of pulmonary tuberculosis is based. Knowing that the sputum is positive is important from the point of view of immediate differential diagnosis after the x-ray has been taken. However, if the sputum is negative, serial x-ray observation of the patient soon leaves little doubt as to the nature and progress of the lesion being dealt with.

That the present-day value of the x-ray in the early diagnosis of tuberculosis should be questioned seems incredible. Yet more than one otherwise well-informed physician has queried the writer on this subject. The confusion, of course, lies in the latitude of the term "early" and in individual interpretation of its meaning and limits. Technically, a person has tuberculosis the minute he begins to react to the first invading tubercle bacillus. However, the x-ray cannot reveal a single microscopic tubercle, and when disease is classified as clinically early it may be quite old chronologically. Practically, the physician is concerned with "early" tuberculosis in the clinical sense, i.e., with the extent of disease present. From this point of view the x-ray is an extremely sensitive diagnostic instrument. It can demonstrate tenuous infiltrations long before these are detectable by the stethoscope, and long before they have advanced beyond the stage in which the prognosis for cure is almost one hundred per cent.

Tuberculosis is every bit as much a threat to life as is an attack of acute appendicitis. If the suspicion of acute appendicitis warrants a laparotomy, certainly the suspicion of tuberculosis warrants an x-ray. Many physicians hesitate to advise an x-ray because the latter is expensive and the patient not too well off. The tuberculosis-minded physician knows that neither he nor the patient can afford *not* to have an x-ray taken.

This is particularly so when examining Mantoux-positive contacts to a known open case of tuberculosis. Not to x-ray such contacts will inevitably lead to the frequent missing of active cases of the disease. To miss just one case, and to allow that case to develop advanced disease, may not only cost the patient's life, and perhaps the physician his reputation, but will cost somebody—relatives or the state—enough to pay for hundreds, possibly thousands, of x-rays. Multiply these costs by the number of cases infected by the one in question, and the cost of not taking an x-ray may be staggering. If a patient cannot afford to pay for an x-ray, he should be referred to an agency that will take it free of charge. No state can afford to be without such agencies.

*Pleural Effusion Without an Apparent Pulmonary Lesion*—James Alexander Miller states<sup>2</sup> that pleural effusion occurs as a prephthical phenomenon in about one out of every four cases of pulmonary tuberculosis. He also points out that between one-third and one-half of all adults with pleural effusion develop obvious pulmonary tuberculosis within the following few years.

The differential diagnosis of pleural effusion is seldom difficult. Causes other than tuberculosis are usually easy to rule out. They are heart disease, renal disease, malignancy involving the mediastinum or pleurae, acute rheumatic infection, beri-beri, and the "terminal" effusion that accompanies the lingering illnesses of old age. Having excluded these causative conditions, and neglecting those which are medical curiosities, the physician will be almost one hundred per cent correct in assuming that an effusion is tuberculous. It may have a greater effect to state that the physician will be almost one hundred per cent wrong if he assumes that such an effusion is non-tuberculous.

A tuberculous pleural effusion almost invariably means active pulmonary tuberculosis.<sup>3</sup> Occasionally the tuberculous focus may be under the parietal pleura. There may be active associated hilar gland infection. The pulmonary lesion may be obvious, but commonly the best roentgenographic technique fails to demonstrate it. In these cases the responsible lesion may consist of but one or two soft, microscopic, subpleural tubercles. To those not familiar with the variable re-



sponse of the body to the tubercle bacillus, a large effusion may seem entirely out of proportion to such a tiny, invisible focus. To those who are familiar with such responses, a massive effusion is consistent and to be expected. A tuberculous pleural effusion is the result of an acute exudative reaction to a specific allergen by a large surface-area which has become sensitized to that allergen. As in the case of most allergies, the quantity of irritant present may be very, very small.

It is far more pertinent, then, to state that *all* patients with a "primary" tuberculous effusion *have* pulmonary tuberculosis, than to state that a certain number of these patients will *eventually* develop pulmonary tuberculosis. If it is accepted that all these patients *already have* active pulmonary tuberculosis, and already have advanced the first step toward potential, full-blown phthisis, the indicated treatment leaves no room for controversy. It will be the treatment of active pulmonary tuberculosis. This will include at least six months at bed rest and modified bed rest. The periodic follow-up of these cases should be just as close as if gross disease had been present.

The wide discrepancy in statistics on the incidence of gross, active, pulmonary tuberculosis following "primary" pleural effusion is probably dependent on differences in care which the patients have taken or received. The degree of care taken will usually depend on the attending physician's advice and on the intelligence and economic circumstances of the patient. Patients who resume activity early and who remain in contact with the original source of infection are more likely to develop gross pulmonary lesions.

Jaffe states<sup>4</sup> that tuberculosis of the pleura is always secondary. Schuman states<sup>5</sup> that in 80 per cent of cases of "primary" pleural effusion Jacobaeus has been able to observe pleural tubercles through the thoracoscope. It is probably safe to assume that all patients with "primary" pleural effusion have tubercles just beneath the pleura. When the effusion becomes absorbed, the visceral and parietal pleurae become adherent in the region of the subpleural tubercles, and usually elsewhere as well. This anatomical fact is probably of considerable significance in regard to later reactivation of dormant subpleural tubercles. Marked inspiratory excursions

will exert traction on the adherent areas and may well produce sufficient trauma to the tuberculous focus to result in extension of the disease process. Traction over a healed tubercle is much less likely to cause extension than traction over a tubercle which is still caseous. This logical inference should alone be sufficient to caution the physician that overtreatment rather than undertreatment is indicated. Another argument for thorough treatment is that if these cases are allowed to develop a cavity, they will probably have to have a thoracoplasty. Adhesions will nearly always render artificial pneumothorax impossible.

Having diagnosed a tuberculous pleural effusion, the physician must decide how and by whom treatment is to be given. If the physician decides to treat the case himself, he will be governed, of course, by his own ideas. If he elects to refer the case to a tuberculosis specialist or to a sanatorium, it is in the best interests of the patient that the decision to aspirate or not to aspirate the fluid be left to the judgment of the physician who will actually supervise the treatment. The physician who first sees the case should, of course, always aspirate a few cubic centimeters of fluid for laboratory study and differential diagnosis. Massive aspiration for therapeutic purposes is a different matter. There is considerable controversy as to whether a "primary" tuberculous effusion should or should not be aspirated, except when removal of fluid is indicated for relief of pressure symptoms. Some physicians, without broad experience in pneumothorax therapy, routinely aspirate these effusions and institute artificial pneumothorax even though they intend to refer the case. Such treatment may not only be contrary to the ideas held by the specialist, but may result in serious complications for the patient. During the early stages of an effusion, the pleura is acutely inflamed and should be disturbed as little as possible. These cases are often unsuitable for pneumothorax because of pre-existing adhesions, and cannot often be carried for long under successful collapse because of the obliterative pleuritis which nearly always sets in. Not infrequently the fibrinous coating on the visceral pleura rapidly thickens and organizes. If this happens while the lung is in the collapsed state, re-expansion may

be impossible. Spontaneous pneumothorax, broncho-pleural fistula, and empyema are not uncommon consecutive complications in primary effusions treated by inexpertly administered pneumothorax.

*The Tuberculin Test*—The number of physicians who are diffident in their interpretation of the meaning and value of the tuberculin reaction is surprising. One of the most common errors is the assumption of a relationship between the intensity of the tuberculin reaction and the activity or extent of the disease that may be present. In this connection it should be remembered that the tuberculin reaction is an allergic reaction and that its intensity is a measure only of the degree of allergy present. The degree of allergy present is merely a measure of the ability to react in a certain manner, and bears no consistent relationship to the activity or extent of any disease that may be present.

In the interim between attacks, victims of asthma and hay fever retain the ability to react to the allergens which cause their attacks. Likewise, but with no pretense to extend the analogy, the individual who once has been sensitized to the tubercle bacillus retains the ability to react to tuberculin years after the original attack of tuberculosis has been completely arrested. This individual may have a much more intense reaction to tuberculin than a person with active disease.

The subject of allergy in tuberculosis, particularly in relationship to immunity, is highly complex and by no means well understood, but on one clinical point the physician can be positive. The tuberculin reaction does not measure the activity or extent of disease present or previously present, and cannot be used to measure the progress of known disease. There are many variables in the allergic state. Perhaps the most constant factor is the individual constitution, i.e., inherited qualities.

Another conception not uncommonly encountered is that a severe tuberculin reaction indicates a high susceptibility to the disease tuberculosis and, therefore, not too good a prognosis if disease should develop. Actually, there is much good argument for the reverse conception. As just indicated, the relationship between allergy and immunity in tuberculosis is still a disputed question.

The general practitioner should keep the

following facts in mind in regard to the tuberculin reaction.

1) The tuberculin reaction is not a test for tuberculous disease, it is a test for tuberculin allergy.

2) Being a test for allergy, a positive reaction indicates nothing more than previous sensitization to the tubercle bacillus. The disease causing this sensitization may have long since been arrested. The test does not distinguish between active and arrested disease.

3) Tuberculin allergy, like any other allergy, waxes and wanes in intensity with many variable factors. Patients with known tuberculin allergy may give a negative reaction during acute infectious diseases, in tuberculosis associated with marked toxemia, especially in miliary tuberculosis, and in tuberculosis approaching the terminal stage. An attack of simple acute tonsillitis with fever may render the tuberculin test negative in a child. Severely debilitated or malnourished individuals, especially the aged, may fail to react to tuberculin, or to any other allergen for that matter. In all these cases the individual's reactivity is said to have been depressed to an "anergic" state, and the lack of reaction is termed a false negative.

It is the false negative reaction which is of clinical importance, because it may lead to the overlooking of active tuberculous disease. It should not be forgotten that it may require several months for tuberculin allergy to develop following the onset of a primary infection.

4) With properly prepared tuberculin, genuine false positive reactions are uncommon. A false positive reaction may be obtained in leprosy, in actinomycosis, and in blastomycosis.

5) Allowing for false reactions, the specificity of the tuberculin (Mantoux) test is very high. In the higher concentrations used for clinical testing, a negative reaction rules out tuberculosis with an accuracy approaching 98 per cent.

6) A positive tuberculin reaction merely indicates allergy. The clinical significance of this allergy must be evaluated in relation to the age of the individual. In older individuals whose chances for acquiring infection have extended over many years, a positive reaction is much more likely to be associated

with inactive than active disease Under the age of two years, a positive tuberculin test is almost always an indication of active disease Under the age of five years, a positive test should always incite a thorough investigation to exclude active disease Above the age of five years, the value of the positive reaction as an indicator of likely active disease falls off sharply

The greatest value of the tuberculin test lies in the ability of the negative reaction to exclude tuberculosis at all ages, and in the ability of the positive reaction to incriminate tuberculosis during the first few years of life

*On Collecting Sputum*—The average physician would not trust a completely inexperienced person to collect blood for a blood count Yet the same physician will trust completely inexperienced patients to "collect some sputum in a bottle" The decision as to whether a lesion revealed by the x-ray is tuberculous or not is a vital decision and may often be reached in a very short time by the careful examination of a carefully collected sputum specimen Carelessly collected sputum may be of no value and may result in delays which allow unnecessary progression of the lesion

Many individuals do not distinguish between sputum, "spit," and naso-pharyngeal secretions "Sputum," after all, is a fairly technical word, and there are probably not many physicians who appreciated its specific meaning before they studied medicine There are plenty of persons to whose vocabulary the word "saliva" is unknown, and who regard "sputum" as the doctor's polite word for their less delicate "spit" Telling a patient to "expectorate into a bottle" is another source of misunderstanding To many people, "expectorate" means just to spit or to clear the naso-pharynx and then spit

When requesting a patient to bring a specimen of sputum, the source of the latter should be specified The instructions commonly given by the writer are "Cough up the phlegm from deep in your chest and spit it into the bottle" This is supplemented by stating that the specimen collected is to contain as little "spit" and naso-pharyngeal secretion as possible If the patient is conscious of bringing up sputum only a few times a day, he is instructed to wait for such times to obtain the specimen The patient should always be

instructed to bring the specimen which he coughs up from his chest immediately on awakening in the morning

Children, and many adults, swallow their sputum These individuals will often state that they have no cough and that they raise no sputum On questioning, however, they may admit that they have to clear their throats and swallow frequently Their true sputum may be laden with bacilli and well worth collecting in the proper manner

Some persons will deny they have any sputum even when the physician can hear it rattling in their throats Probably this is often as not a defensive psychological reaction The individual dreads the idea of tuberculosis, and subconscious persuasion influences her, sometimes him, to hinder the establishment of such a diagnosis as much as possible These instances exemplify the psychological phenomenon of resistance Then, again, there are individuals of such a fastidious temperament that they cannot allow themselves to be persuaded that they, of all people, could have such a horrible thing as sputum Persons with psychological reactions such as the above will often fill their bottles with negative saliva when they could easily fill them with positive sputum

When it is suspected that the collection of sputum specimens by the patient is unsatisfactory, resort should be had to more certain methods These include the "laryngeal mirror test" (coughing tracheo-bronchial secretion directly onto a laryngeal mirror held over the larynx), gastric lavage, sputum concentration, cultures, and guinea pig inoculation

*The Relativeness of Negative Sputum*—It should not be forgotten that the term "negative sputum" is a relative one only in many instances It has been estimated that more than a hundred thousand bacilli must be present in each cubic centimeter of sputum before they can be found in a direct smear<sup>6</sup> The reason, of course, is, by analogy, the difficulty of finding a needle in a haystack Certainly a sputum which contains one hundred thousand bacilli per cubic centimeter can be considered negative in only a technical sense The relativeness of "negative" sputum undoubtedly gives rise to many a false sense of security, and provides a good argument for doing routine concentrates and cultures

Twenty-five thousand bacilli per cubic centimeter of sputum mean tuberculosis just as emphatically as do five hundred thousand bacilli per cubic centimeter

The relativeness of "negative" sputum also emphasizes the valuelessness of a single sputum examination. A patient's sputum may constantly contain, say, seventy-five thousand bacilli per cubic centimeter. The laboratory may examine a score of specimens of this sputum by direct smear before being lucky enough to find a few acid-fasts.

The sputum may not contain tubercle bacilli, even by culture or guinea pig inoculation test, in advanced productive lesions, in late acute exudative lesions, and in healed fibrotic lesions, although the x-ray may indicate extensive involvement. Thus a negative sputum by no means excludes pulmonary tuberculosis.

#### *Artificial Pneumothorax*

Artificial pneumothorax is the mainstay of collapse therapy in pulmonary tuberculosis. The administration of artificial pneumothorax is a relatively simple procedure, but it is one which can have more tragic consequences if done inexpertly than almost any other procedure in medicine. By "inexpertly" is meant not only in regard to technique but also in regard to the judgment as to whether or not artificial pneumothorax is indicated. Many cases of tuberculosis are not suitable at all for artificial pneumothorax, and the entire course and prognosis of a case may be unfavorably altered by its injudicious administration. Many cases which are unsuitable for artificial pneumothorax when first seen may be ideal cases a month or so later when bed rest has reduced an acute toxic state. The induction period—the initial filling and the first few refills—is a critical time in pneumothorax administration. It is so critical that those most experienced in this form of therapy will not risk the chance of inducing artificial pneumothorax in the office, and certainly never in the patient's home. Fluoroscopic and x-ray control are absolutely essential. It may be immediately evident after the initial filling that the pneumothorax must be abandoned, or continued with great caution as to size and frequency of refills. Failure to recognize these indications may initiate a sequence of spontan-

eous pneumothorax, fluid formation, broncho-pleural fistula, empyema, and the eventual necessity of doing a complete thoracoplasty. The induction period of pneumothorax is the most likely time for the occurrence of air embolism. Many patients are robbed of the continued benefits of pneumothorax by an obliterative pleuritis resulting from fluid formation which, in turn, results from premature induction in toxic cases or from failure to recognize the presence of tense adhesions.

If the physician intends to refer his tuberculous patients, he should refrain from instituting any active measures of treatment unless some urgent condition, as hemoptysis, demands such treatment. It is not fair to the patient to neutralize the benefits of reference to the specialist by a contraindicated pneumothorax or by the complications of pneumothorax. It is not fair to the specialist to ask him to remedy the incurable complications of a curable disease, or to ask him to continue a form of treatment which should never have been instituted but which, unfortunately, may now be irreversible. The inexperienced physician is not being fair to himself by indiscriminately inducing pneumothorax. His lack of judgment will be perceived immediately by the specialist and sooner or later by the patient. Tuberculosis is a disease which requires years of treatment. There is seldom any emergent need for the institution of active treatment. The time and method of active treatment should be chosen only after careful consideration of the case. The question as to whether the patient should have bed rest alone, phrenic paralysis, artificial pneumothorax, thoracoplasty, or a combination of these measures, involves judgment and experience which the specialist alone usually possesses.

#### *The Physician's Alertness to Tuberculosis*

Regardless of the fact that the x-ray offers a very exact method for the early diagnosis of tuberculosis, the x-ray will not be taken and the disease will not be diagnosed early unless the physician is alert to the prevalence and insidiousness of tuberculosis. Tuberculosis is often far advanced before it gives rise to pronounced manifestations. This being so, the physician must maintain a high index of suspicion toward such trivial symp-

toms as unusual fatigue, protracted cough following a cold, persistent ache in the chest, slight weight loss, and the complaint of feverishness. If tuberculosis is to be diagnosed early, it is manifestations such as these which must suggest the x-ray.

There is vast room for improvement in the early diagnosis of tuberculosis. Even today about 54 per cent of patients admitted to sanatoria have far-advanced disease, while only 16 per cent of the cases are classified as minimal.

Tuberculosis is the seventh leading cause of all deaths. It is the most common cause of death up to the age of forty-five, if accidental causes are excluded. Contrary to common opinion, it is one of the most common

causes of death in old age. With these facts at hand, it is not trite to advise the practitioner to keep tuberculosis in mind always.

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## The Detection of Early Tuberculosis in Detroit

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We all know the personal satisfaction derived from a correct diagnosis early in the course of disease. This applies particularly to acute conditions and especially where surgical intervention is indicated. It is perhaps no less important, however, in so-called chronic diseases because early diagnosis and instigation of proper treatment often mean the difference between success and failure in caring for the patient. This certainly holds true in pulmonary tuberculosis where modern collapse therapy is more likely to be successful in unilateral lesions and when the duration of the disease is short.

Until recently the diagnosis of tuberculosis often depended upon a combination of several of the following factors: contact history, symptoms, physical signs, sputum examination, tuberculin test (especially children) and x-ray evidence. A diagnosis of tuberculosis was considered only with the following symptoms, unless otherwise accounted for: weakness, indigestion, loss of weight, increased temperature (afternoon or evening), persistent cough or expectoration, night sweats, hemoptysis—especially of one teaspoonful or more—or a pleurisy.

Though these factors still remain most important, it has been shown conclusively that this disease produces no appreciable symptoms in many cases until it has progressed to a moderately advanced stage. The detection of early tuberculosis, from the family physician's point of view, thus may be divided into two broad groups: (1) symptomatic and (2) asymptomatic. The general practitioner is chiefly interested in the first or symptomatic group since the great majority of the population consults him only when disturbing symptoms appear. This factor in itself, it is recognized today, greatly handicaps the physician in his ability to make an early diagnosis, however alert he may be.

On the matter of physical signs, the present status is well expressed by Chadwick: "Refinements of the art of percussion and auscultation have been developed to an extraordinary degree. The result was that many persons without tuberculosis were wrongly diagnosed, given treatment and apparently cured of a disease they never had. The family doctor has been much abused and the medical schools criticized for failing to teach their students how to make an early diagnosis. The roentgenogram came to the defense of the general practitioner and proved

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that he had been only a few degrees farther off from the true course than the ultra-trained specialist!"

In Detroit, the Department of Health, with the cooperation of the Wayne County Medical Society and the Detroit Tuberculosis Sanatorium, carried out a thorough concentrated program among the general public for several years. There were frequent radio talks, newspaper articles and wholesale distribution of posters and leaflets, the latter going into practically every home through the schools. The public was advised to go to their family physicians for examination as soon as symptoms appeared.

The 1940 Annual Report<sup>2</sup> for this city shows that 15.6 per cent of new cases of active tuberculosis were classified minimal. The results given include (a) patients reported by private physicians, (b) low economic groups applying to Department of Health for diagnosis and care, as well as family contact examinations, and (c) cases diagnosed in hospitals. Private physicians alone reported 19.3 per cent minimal lesions, a higher proportion than the general average of 15.6 per cent (Table I). But are we satisfied with a one in five early diagnosis?

TABLE I

Type	Cases	Per Cent
Minimal active	216	15.6
Moderately advanced active	613	44.4
Far advanced active	553	40.0
TOTAL	1,382	100.0

Notwithstanding a comprehensive educational program, the percentage of early lesions remains low. It is apparent, therefore, that this disease must be approached in other ways if the high per cent of advanced cases is to be reduced. This brings us to consideration of group 2, the asymptomatic group. Here it becomes necessary to investigate the apparently healthy for the evasive early cases by tuberculin test, x-ray screening or by x-ray directly. This group is particularly drawn to the attention of those physicians who not infrequently reject the diagnosis of active tuberculosis in the absence of symptoms.

A great deal of tuberculosis case-finding work has been carried out in recent years among the general public. The results for

comparable groups are practically constant in showing that active tuberculosis can be found without appreciable symptoms and often without apparent abnormal physical signs. This is particularly true in the detection of early lesions.

Since tuberculosis is generally recognized to be a greater menace in the low socioeconomic group, in 1936 the examination by x-ray was undertaken of 1,000 unemployed homeless men. Twenty-one cases, or 2.1 per cent, of active tuberculosis were found and 46 inactive cases (Table II). One notes that

TABLE II  
ACTIVE TUBERCULOSIS SYMPTOMATIC AND ASYMPTOMATIC

Case	Age	Color	Classification	Symptoms	Signs	Contact
1	48	W	Minimal	—	—	—
2	46	W	Far Adv	+	+	—
3	31	W	Minimal	+	—	+
4	33	W	Far Adv	+	+	—
5	34	W	Minimal	—	—	—
6	36	W	Mod Adv	+	+	+
7	31	W	Minimal	—	—	—
8	43	C	Minimal	—	—	—
9	37	W	Minimal	—	—	—
10	36	C	Minimal	—	+	—
11	50	W	Far Adv	—	+	—
12	21	W	Far Adv	+	+	+
13	34	W	Mod Adv	—	+	—
14	66	W	Minimal	+	+	+
15	44	W	Minimal	—	—	—
16	42	W	Minimal	—	—	—
17	46	W	Mod Adv	—	+	—
18	33	W	Minimal	+	—	—
19	40	W	Minimal	—	—	—
20	40	C	Mod Adv	—	+	—
21	46	W	Minimal	—	—	—
TOTAL				7	10	4

symptoms were present in only 7, or 33 per cent, of those having active disease, in spite of the fact that 8 of the 21 active cases had moderately advanced or far-advanced disease. Of the 13 classified minimal disease symptoms were present in only three, or 23 per cent.<sup>3</sup>

In 1932 a survey was made of 1,432 boys and girls (ages 15 to 18) in a high tuberculosis rate area by the tuberculin test x-ray

method.<sup>4</sup> Fourteen cases, or 1 per cent, were found to have reinfection tuberculosis (then called adult type disease), ten, or 71.4 per cent of which were classified minimal. Note the small number in this study showing symptoms or signs or contact history (Table III).

TABLE III  
ACTIVE TUBERCULOSIS SYMPTOMATIC AND ASYMPTOMATIC

Patient	Classification	Symptoms	Signs	Contact
1	Minimal	—	—	—
2	Minimal	—	—	—
3	Minimal	—	—	+(father)
4	Mod Adv	+(1 yr)	SI +	—
5	Mod Adv	+(2 mos)	+	—
6	Mod Adv	—	—	—
7	Far Advanced	+(2 mos)	++	+(lodger)
8	Minimal	—	—	—
9	Minimal	—	—	—
10	Minimal	—	SI +	—
11	Minimal	—	—	—
12	Minimal	—	—	—
13	Minimal	SI +(1 wk)	—	—
14	Minimal	—	—	—

One might mention here that a great number of pediatricians routinely tuberculin test all their patients now.

It is appreciated that the small number of active cases of tuberculosis discovered by the usual means lends little inducement to general practitioners to spend much of their valuable time in handling these cases. However, when you add the asymptomatic group, the need for entering this field becomes greater, with consequent increased remuneration. Diagnosis in the large asymptomatic group is being greatly increased today among working groups and will be more so in the next few years as the result of weeding out in the Services by mass x-ray methods.

Though our diagnostic aim must be to find all early lesions, it is a worthy goal at this time to increase the minimal cases from one-fifth to four-fifths. This can be done by the family physician and all other physicians taking their proper place in dealing with the disease. Observation, between x-ray readings, of patients with benign circular lesions is an example.<sup>5</sup> A successful program along this line was carried out locally for a while in

conjunction with the Wayne County Medical Society, known as The Medical Participation Program.<sup>6</sup> This was certainly a move in the right direction and might well be renewed and extended in the best interests of the community and the profession.

### Summary

Early tuberculosis may be divided into two groups—symptomatic and asymptomatic.

Thorough examination, including tuberculin test x-ray procedures should be carried out immediately in all patients presenting themselves with suggestive symptoms.

*If symptoms are present and persist*, a negative tuberculin test should not be depended upon, an x-ray being indicated before a negative diagnosis is made. It is further advisable to re-x-ray the lungs after a reasonable time should the first reading fail to show pathology.

If the diagnosis of tuberculosis is considered only in those with suggestive symptoms, a large per cent of cases are missed. This also occurs if one depends entirely on abnormal physical signs or on a contact history.

A positive tuberculin test during the first two years of life, especially the first 12 months, generally means active tuberculosis. For the age period three to five years, a positive tuberculin calls for an x-ray, repeated at intervals though negative if there are any symptoms or if there remains in the household a source of infection. The school age period 6 to 14 years has comparatively the least amount of active tuberculosis. *From 15 years upwards the reinfection type begins to appear more frequently. It is the more serious form and is mainly responsible for the spread of this disease.*

For the detection of early tuberculosis, therefore, the general public, particularly in the age group 15 to 35 years, should be x-rayed with or without a preceding tuberculin test and irrespective of whether there are symptoms or abnormal physical signs. This applies especially to adolescents and young adults applying for high school and college teams, and to all who work regularly to even a mild degree of exhaustion either because of type of work (physical or mental) or because of the number of hours so engaged.

A higher rate of tuberculosis is found in the poor sections of large cities and where



there is usually overcrowding Where the area served by the physician is inhabited chiefly by unskilled labor he can expect to find the death rate from this disease eight times as high as among professional workers

It is necessary for the detection of early tuberculosis that the services of a roentgenologist be made available to all physicians for both their pay and non-pay patients

Finally, the inactive disease cases may become active if not properly advised and kept under observation It is the writer's studied opinion that these patients will be better served under direct control of the family physician Accordingly, it is advisable for the general practitioner to familiarize himself with inactive tuberculosis, especially early cases The care of such patients is well within the general practitioner's field providing he is supplied with periodical x-ray interpretations

**Recommendations**—In many small communities there is a lack of x-ray facilities, thus handicapping the local physicians in the diagnosis of early tuberculosis Since the most important single factor of a successful program is the x-ray, it is suggested that the local county medical societies investigate the needs of communities and present a plan to

the proper administration authority through the health officer The cooperation of local or nearby roentgenologists is usually assured on proper financial arrangements Whether the purchase of an x-ray machine is necessary can be readily decided In very small or sparsely populated areas, the roentgenologist can use a portable machine to advantage and within the financial capacity of the area served Under any circumstances, local physicians cannot be expected to diagnose early lesions unless a roentgenologist's service is available The cost of this service is reasonably chargeable to the community when the local physician certifies inability of the patient to pay

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## Organization News

### DR SINGER APPOINTED MEDICAL DIRECTOR

Dr J J Singer, Los Angeles, California, a Fellow of the American College of Chest Physicians, was appointed medical director of the Los Angeles Sanatorium, Duarte, California Dr Singer will continue his private practice at Los Angeles as consultant in chest diseases as well as his many other activities concerned with his specialty Dr Singer is president of the tuberculosis section of the Los Angeles County Medical Society, Director of the Rose Lampert Graff Foundation, an organization devoted to research in tuberculosis, and Associate Clinical Professor of Medicine at the University of Southern California

The Los Angeles Sanatorium is a national non-sectarian institution for the care and treatment of indigent tuberculous patients and it is maintained by the Jewish Consumptive and Ex-patients Relief Association During the past thirty years, the sanatorium has cared for more than 10,000 indigent patients

### ANNOUNCEMENT OF FELLOWSHIPS IN MEDICINE AND PUBLIC HEALTH

(Offered by the Commonwealth Fund of New York Through the Pan American Sanitary Bureau)

The Commonwealth Fund of New York a philanthropic foundation established in 1918 by the late Mrs Stephen V Harkness, announces

that it is offering through the Pan American Sanitary Bureau fifteen fellowships for one year's study of public health subjects or postgraduate medical courses to properly qualified persons who are citizens of the other American republics Fellowships in public health will be open to physicians, sanitary officers technicians, public health nurses, etc These fellows will be selected through a system of cooperation with medical and health authorities of the different countries concerned, and whenever deemed advisable they will be interviewed by traveling representatives of the Pan American Sanitary Bureau Each fellowship will provide living allowances while the holder is in the United States, travel costs, and tuition Knowledge of the English language will be among the requirements, and also the possession of certain specific qualifications

The Pan American Sanitary Bureau, the international health agency of the American republics, has been for some time the recognized clearing house for medical and public health fellowships in the United States nearly 100 Latin Americans now being in the United States under its auspices

Application blanks giving complete information will be available through the Commonwealth Fund 41 East 57th Street, New York, the Pan American Sanitary Bureau, Washington, D C or chiefs of American Missions in Latin Amer

## "Information Please"

### A Quiz on Diseases of the Chest

## EXPERTS

<i>Medicine</i>	George G Ornstein, M.D, New York City Champ H Holmes, M.D, Atlanta, Georgia
<i>Surgery</i>	Richard H Overholt, M.D, Brookline, Massachusetts Ralph C Matson, M.D, Portland, Oregon
<i>Physiology</i>	Harold D Greene, M.D, Cleveland, Ohio
<i>Bronchoscopy</i>	Louis H Clerf, M.D, Philadelphia, Pennsylvania
<i>Roentgenology</i>	Joseph W Post, M.D, Philadelphia, Pennsylvania Benjamin Goldberg, M.D, Chicago, Illinois, <i>Presiding</i>

The following questions were directed to the above-mentioned experts at the annual meeting of the American College of Chest Physicians held at Cleveland, May 31, 1941. The questions were submitted by the members of the College who attended the session and were answered by the experts without rehearsal. "Information Please" with regards to diseases of the chest was inaugurated at the College meeting at New York City in 1940 by Dr Edward P Eglee, Regent of the College for New York State, and it has been well received at each of the annual meetings to date. The questions and replies for the "Information Please" meeting held at Atlantic City this year, will be compiled and published in a future issue of the journal—Ed

To Dr George G Ornstein

**Question** What is the difference between gelatinous and caseous tuberculous pneumonia?

**Answer** Gelatinous tuberculous pneumonia was the term given to the form of exudative pulmonary tuberculosis in which there is little death of pulmonary tissue. The disease is the result of tuberculo proteins and high allergy to the latter. There is a marked serous exudate filling the alveoli with little fibrin and cellular elements present. The fact that there is little lung destruction and that the chief element is serous fluid, reabsorption and rapid healing occurs. Fraenkel described the pathological picture well and reproduced it experimentally in animals. All forms of exudative tuberculosis that reabsorb rapidly belong to this group. Epituberculosis belongs to this resolving form of pulmonary tuberculosis.

Caseous pneumonic tuberculosis differs in that in the presence of a great deal of al-

lergy to tubercle bacilli, the dosage of tubercle bacilli also is large. In contrast to little destruction of pulmonary tissue in the resolving exudative pulmonary tuberculosis, the reaction is characterized by the death of the tissues involved, followed by caseation, liquification, and cavitory formation. The course of the disease is that of multiple episodes of reinfection which usually leads to the death of the patient.

**Question** On what grounds can you say that exogenous re-infection is a more frequent mode of tuberculous disease than is endogenous re-infection?

**Answer** The question must be clarified. Endogenous infection may mean reinfection from a secondary infection in the lung. I do not believe the question referred to the above but to reinfection from the primary phase of tuberculous infection. If the primary phase of infection had not gone on to healing reinfection may occur from this unhealed focus but that is entirely different from what the question implies. Is endogenous reinfection a frequent mode of tuberculous disease? I would say no. First, over 99 per cent of the primary phase of tuberculous infection goes on to complete healing. Secondly, if the tuberculous disease had to arise from the primary focus in the lung, the tubercle bacilli would have to move out of these old foci through the lymphatic system to the general circulation to reach other foci of lung. This movement of bacilli is not probable in animals sensitized previously by the primary tuberculous infection. (Kraus-Willis and pathologists have pointed out that there is only evidence of tuberculous infection along the lymphatics in the primary tuberculous infection, and the lymphatic system in re-

infection tuberculosis is characterized by the absence of tuberculous disease. Therefore, those investigators who have such thoughts on endogenous infection still have to prove the mode of invasion through the lymphatics from the original primary foci in the body.

*Question* Discuss the delayed tuberculin reaction and significance.

*Answer* I do not think that there is any definite accepted thought concerning the delayed tuberculin skin reaction. In analyzing the tuberculin reaction, we find in the true sense that it is not a specific reaction. The inflammatory reaction is caused by a toxic portion split off from the tuberculin by some form of antibody that is present in the tissue of animals and humans sensitized by a primary tuberculous infection. When I worked in Petroff's laboratory at Trudeau in 1920, we mixed old tuberculin and tuberculous diseased lung tissue in a test tube and incubated the mixture over a period of time. After eight hours, and more effective after 24 hours, some of the end product dropped into the eye of a normal and tuberculous rabbit would produce the same reaction. A toxic product was apparently let off by the tuberculin which produced the inflammatory reaction in both the normal and tuberculous rabbit. The mixture before incubation produced no such reaction in the normal rabbit but did in the tuberculous rabbit. From the above experiment I assume that a delayed reaction simply means that the tissue splits off slowly the toxic portion of tuberculin and 48 to 72 hours were required for the production of a sufficient amount of the toxic product to produce the reaction.

*Question* How would you explain a fatal anoxia which developed after re-expansion of a bilateral pneumothorax of long standing for extensive disease without evidence of chor pulmonic?

*Answer* The answer lies in the fact that when a lung with extensive disease that has been collapsed by pneumothorax expands, there is usually less functioning lung tissue than before the pneumothorax. This is easily explained on the basis of the development of marked thickening of the visceral pleura especially when the pneumothorax is complicated by a pleural effusion. Furthermore, the greater the collapse, small patchy atelectatic areas occur which may never again

re-expand. With the above in mind, two distinct answers may be given for the fatal anoxia. First, in reexpanding collapsed lungs following pneumothorax, the diseased areas which did not function during the collapse therapy partly reexpand and patients previously free of expectoration, now may expectorate a great deal. Some of the phlegm may obstruct the bronchus to that part of the good functioning lung and an acute anoxia develops, especially where the aeration depends entirely on both lungs functioning at its maximum. We have seen the above happen. The other explanation is in bilateral pneumothorax where a spontaneous pneumothorax occurs in one of the lungs with insufficient lung volume in the other lung to aerate the blood. This frequently happens in the maintenance of bilateral pneumothorax. A number of our bilateral pneumothorax cases have died after leaving the hospital to be cared for at the outpatient clinic. During the pneumothorax treatment the lung may be traumatized by the needle, followed by a spontaneous pneumothorax. The patients leave the clinic feeling well but before they reach home suffer from an acute anoxia. The ambulance surgeon, not familiar with the situation, attempts to alleviate the patient with oxygen. Two of our patients died before reaching the hospital. We do not discharge bilateral pneumothorax patients without giving them a card with instructions for the ambulance surgeon or the doctor called. The patients also carry a small kit with a 3-inch needle and rubber tubing and bottle for the relief of the spontaneous pneumothorax. The card also has a diagram of how and where to insert the needle into the pleural cavity and connect the rubber tubing to the needle and to a tube which reaches 1 cc below the water in the bottle which also has a second opening in the rubber stopper for the air to escape. We have not had any more deaths of this type since.

*Question* How effective is a mask in the prevention of pulmonary tuberculosis in nurses, maids and orderlies? What type of mask is most efficient? How long does the average surgical mask protect the wearer?

*Answer* In the past five years we have had our student nurses at the Metropolitan Hospital under careful observation. We found that our negative tuberculin reactors convert

to positive tuberculin reactors in our non-tuberculous wards (We do not allow our negative tuberculin reactors to have the tuberculosis service) Because most of the negative tuberculin reactors convert to positive reactors before they finish their training the contact is with open cases of pulmonary tuberculosis on the non-tuberculosis services

We thought of x-raying the lungs of every new admission to the non-tuberculosis service and in that way spot the open cases. Unfortunately the expense prohibited the procedure. We, therefore, decided with the next group of students entering the hospital to have them wear a mask whenever they are on a ward. We had eight student nurses that entered training and reacted negatively to 1 mg of old tuberculin intracutaneously. One of the student broke her pledge and worked with her mask off after five months. She converted to a positive reactor. The other seven at the time of the correction of the proofs of the question on the quiz (10 months) are all still tuberculin negative. Therefore, the mask is a definite protection against tuberculous infection in the nurse. We like to use a large celluloid mask and find this type of mask the most comfortable of all. They are easily cleansed by wiping the inside of the mask with 70% alcohol.

*Question* Would you treat an exudative productive tuberculosis by bed rest alone?

*Answer* It has been my custom to treat this form of pulmonary tuberculosis by means of bed rest. Most important is the finding of the contact and isolating the patient from the contact. I have been most conservative about the management of the resolving exudative pulmonary tuberculosis though other clinicians have had as good results and allowed their patients after a few weeks of rest to continue on with their routine work. In one of the universities that has been the procedure with managing the students having this form of pulmonary disease I had two nurses who insisted on carrying on after this type of tuberculosis was discovered and the disease resolved as well and quickly as those I treat with bed rest. I intend to use bed rest for the treatment of this type of case and especially make sure they are isolated from open cases at all times.

*Question* Dr Ornstein, while you are up, will you amplify that further in the state-

ment you made this morning concerning rest in the treatment of tuberculosis?

*Answer* I asked the question about rest and it seems that I have to answer it. We all have come to the conclusion that all forms of pulmonary tuberculosis are not alike and run different courses. The resolving exudative forms do very well with rest and isolation from open cases. The productive form which Aschoff called the acinous nodose form of pulmonary tuberculosis also has an inactive and usually symptomless course. The disease slowly brouses down the lungs and produces the nodular type of pulmonary tuberculosis. It takes 20 to 30 years to progress sufficiently to produce enough pulmonary dysfunction. Even in the advanced stages tubercle bacilli are difficult to identify in the sputum of these cases. The disease is very chronic and symptomless and requires very little treatment.

There is need for active therapy for only one form of pulmonary tuberculosis and that is the caseous pneumonic form. To make it simpler, the cavity form of pulmonary tuberculosis. I am against rest treatment alone in this type of pulmonary tuberculosis. We may say that 20 per cent may spontaneously get well with rest treatment. Let us reverse the figures and say 80 per cent fail. Therefore, I believe that once a diagnosis of cavity is made, one should not depend on rest treatment alone, with few exceptions. Don't wait but use collapse therapy at once. Good results are obtained in from 50 to 70 per cent of the cases. Certainly no one will deny that patients at high altitudes breath faster than at sea level. If there is something in the mountainous climate, it is not resting the lungs. I do believe there is an advantage being in mountainous climate, but believe it is only a small part of the management and has nothing to do with resting the lungs.

I believe in rest in the treatment of pulmonary tuberculosis, but not as the sole means of therapy.

To Dr Champ H Holmes

*Question* How much value do you now place in the sedimentation test in regard to the discontinuance of artificial pneumothorax?

*Answer* Now I feel in making this decision, that the sedimentation rate is quite an important thing. It gives you a penetra-

tion into the occult that you otherwise may not have. The toxic or positive sputum cases, with a normal sedimentation rate are rare, and if the sputum is positive, that in itself could be a further guide as to whether to abandon pneumothorax or employ other collapse procedures. I would say I would be very reluctant to abandon pneumothorax if the sedimentation rate was unfavorable.

*Question* What is the technic and significance of the Mantoux reaction (tuberculin) test?

*Answer* I will take the significance first. A positive Mantoux or tuberculin test means that there is an infection by the tubercle bacilli somewhere within the body. It does not mean disease. If the individual has a positive skin reaction, then you know he does have an infection, but you must subject him to other methods of examination to tell whether or not the infection has eventuated in disease. The technic is very simple and I am sure familiar to you all. I think the paramount thing is to have a reliable and a fresh preparation of tuberculin. The purified protein derivative is the one of choice. That is, it is the most stable and is standardized over the country. That cannot always be said of the old tuberculin. A small amount, one-tenth cc., is injected into the skin, after the proper cleansing, usually using acetone to defat the tissues. After 48 hours, make your reading.

To Dr Richard H Overholt

*Question* What is the advantage of silk sutures over catgut in chest surgery?

*Answer* It has been quite conclusively demonstrated experimentally that silk is tolerated by tissues better than catgut. For solidarity of healing, in our opinion, it is preferable to catgut. We have used silk in the past three years exclusively in clean cases. Particularly in thoracoplasty silk is favored for this reason. If the patient has excessive coughing, he may disrupt the catgut wound, whereas silk will usually hold or if it does break, it will break in a limited area. It has been our observation that the wounds closed with silk, should they become infected, will heal just as readily as catgut wounds. We have found little difference in the closing of draining sinuses in respect to type of suture material used.

*Question* What do you consider the ideal

balanced combination of anesthetic agents for major thoracic surgery?

*Answer* I consider the ideal anesthetic for general anesthesia in thoracic surgery, cyclopropane with carbon dioxide absorption. For lobectomy or pneumonectomy and for the routine type of thoracoplasty, in which there is not much sputum, we believe cyclopropane with high concentration of oxygen is the ideal anesthetic. One can induce anesthesia quietly and quickly. One can then shut off on the cyclopropane and add just oxygen and maintain anesthesia on low concentrations of the drug permitting high percentages of oxygen. The recovery from the anesthetic is rapid. Within two or three minutes following the conclusion of the anesthesia the patient is awake and able to cough. The advantage of operating upon extremely ill and bad risk thoracoplasty cases under paravertebral block anesthesia is being appreciated more and more. The cough reflex is at no time abolished, a distinct advantage in certain cases.

*Question* What method of closure do you use in broncho-pleural fistula with an existing tuberculous empyema?

*Answer* It is necessary at first to provide adequate and dependent drainage. The chest is packed with gauze after dusting the interior with sulfathiazole powder, and later a thoracoplasty is carried out. The particular type of closure depends upon the situation, that is, the location of the fistula and the condition of the underlying lung. The results are not as satisfactory as we would like, but we do believe that when preliminary sterilization of the pleural cavity can be accomplished, it is possible to close a certain number of these large fistulae and salvage some of the healthy lung.

*Question* Can you tell us why the eastern statistics are not as good as the western in extrapleural pneumothorax?

*Answer* The variation in results must be due to a difference in the selection of cases. It has been our feeling that one should look ahead and try and decide what will be the ultimate outcome if a temporary or permanent form of collapse is employed. Each case should be judged on its own merits. If a patient needs a permanent form, he should have a permanent form, and use that instead of a temporary or semi-permanent form of collapse. Extrapleural pneumothorax cannot

be considered a permanent form of collapse for the ultimate position of the lung is uncertain. We have used extrapleural pneumothorax only for bad risk bilateral cases that were denied the benefit of thoracoplasty. So, naturally, the outcome in such a group of patients would not be good. Any salvage, however, in a group of patients where death from extensive disease was imminent would be so much to the good. I think the difference in results between various surgeons must be a matter of selection of cases. If one treats only patients with minimal or limited disease, it is possible that very excellent results with extrapleural pneumothorax might be obtained with re-expansion of the lung later on. However, I am going to let other surgeons try this operation on the better risk cases for whom we believe thoracoplasty to be safer and of more promise from the long range point of view, and then later their final results and our final results can be compared.

*Question* How would you explain a fatal anoxia which developed after re-expansion of a bilateral pneumothorax of long standing for extensive disease without evidence of *chor pulmonalis*?

*Answer* It would be impossible to answer this question without more data about the pre-terminal condition of the patient. Certain alterations in the cardio-respiratory mechanism do take place with a shift of the thoracic viscera incident to the re-expansion following pneumothorax. Some patients who have had a resection of the lung who have been followed several months or years after operation, show a shift of the mediastinum, with a distortion of the heart and other thoracic viscera so they get into serious difficulties. In one case sudden death was attributed to such a cause. Patients seem to tolerate a shift to the left better than to the right. Recently, Dr Stone, who is here today, was called to see a post-pneumonectomy patient who suddenly presented an alarming picture with an extremely rapid pulse and cyanosis. It was his feeling and ours that the cardio-respiratory mechanism was disturbed by a marked distortion of the thoracic viscera. A thoracoplasty was performed under paravertebral anesthesia. Immediately there was a drop of pulse and respiratory rate and the patient improved. I am convinced that the distortion of the mediastinum

with shift of the heart, especially to the right, affects the great vessels and the heart. When pneumothorax cases are re-expanded, we must watch carefully for disturbances that may take place in connection with a distorted position of the thoracic viscera.

*Question* What complications, if any, have developed in cases in which a Semb type operation has been done? Are they more common on the right or left side?

*Answer* The most common complication, of course, is the formation of excessive fluid in the apicolytic pocket. This may exert pressure on the underlying lung. The pressure of fluid in the space may tend to cause a separation of the upper part of the wound, especially in patients who have severe coughing spells. If the patients are watched carefully, and if excess fluid is removed by aspiration, this complication is of no consequence. Infection of the apicolytic space is a serious complication that may be encountered. Of course, in carrying out surgery tissue is exposed, bacteria may be introduced, and infection may follow. Normally, tissues will resist the introduction of a few bacteria. Thoracoplasty patients are particularly handicapped in this regard to several factors. Chronic illness has lowered general resistance. The wound is large and is closed leaving a large dead space. In thoracoplasty the surgeon must be sure he does not introduce bacteria while the tissues are open. The surgeon must also be sure that the lung is not injured during its mobilization, as bacteria may be liberated from infected lung tissue. If every precaution is taken, there should be very few complications from the Semb operation. It is my impression that complications are not encountered more on one side or the other.

*Question* What is the treatment of endobronchial tuberculosis causing almost complete stenosis and atelectasis?

*Answer* I would agree if the patient is doing well clinically, is free of symptoms and is not apparently suffering from suppuration distal to the stenosis, then, of course, a resection, either lobectomy or pneumonectomy, is not indicated. However, I think in the future that pulmonary resection for this type of lesion, which threatens life on account of drainage difficulties or an extension of the process into the trachea or contra-

lateral bronchus, will be employed with increasing frequency. The resection must be carried out while the other lung is sound.

*Question* In the treatment of pure tuberculous empyema (secondary infection ruled out by repeated aerobic and anaerobic cultures) plus a pleuro-bronchial fistula, do you do an open drainage before going ahead with thoracoplasty?

*Answer* Yes. I think I can answer that question without qualifying it. Patients who have fairly large fistula are very apt to spill unpredictable amounts of tuberculosis material over into the opposite lung during operation. I think the safest thing is to provide external drainage and follow with any suitable procedure to bring the chest wall down to meet the lung.

*Question* In the management of unsuccessful extrapleural pneumothorax which has become complicated by tuberculous empyema, would you advise re-expansion followed by thoracoplasty?

*Answer* Some of these questions are a little bit difficult. Much depends upon the condition of the underlying lung. If there had been considerable destruction of the underlying lung by the disease, I believe that one would want to bring the chest wall down to meet that lung without trying to re-expand it first. The same principles should apply when dealing with trouble developing in extrapleural pneumothorax as apply when handling complications of intrapleural pneumothorax. The best treatment is to avoid these troubles. When tuberculous empyema develops in either case, I believe that the best solution is to remove the pus by aspiration, replace by air, and then obliterate the space by moving the chest wall to a new location.

*Question* Have you used annealed steel wire for closure of a bronchus in lobectomy and pneumonectomy, and do you think it is superior to silk?

*Answer* I have not used silver wire in the closure of the bronchus so that I do not have an opinion as to its superiority to silk. In our experience, closure of the bronchus with interrupted silk sutures has been quite satisfactory. Healing without fistula formation has been accomplished in most instances when we were not treating a suppurating lung. The silk sutures are placed in the stump as end sutures—then mattress sutures above. Re-

cently we have applied sulfathiazole powder directly on the stump after its closure. The area is then covered with pleura or muscle tissue. The thorax is closed without drainage. Silk sutures have the advantage of being handled well should infection develop at the point of suture. The patients may cough them up or some may be removed bronchoscopically. I would hesitate to use silver wire fearing that such suture material would not work itself free from the stump as easily as silk in the event of infection. I hope Dr. Matson will try silver wire and let me know how he gets along.

To Dr. Ralph C. Matson

*Question* What is the advantage of silk sutures over catgut in chest surgery?

*Answer* We are using cotton thread instead of silk in surgery.

*Question* How long should I wait for adhesions to stretch before doing pneumonolysis?

*Answer* A few years ago in our first work we said six months and with improved techniques and other factors, we worked down to three to five months. Now in most of our cases we go in very early. We don't wait for inspection.

*Question* What is the anesthetic of choice for lobectomy? Is Vitamin K of any value for hemostasis?

*Answer* I think Vitamin K is valuable, and the choice of anesthetic is cyclopropane with helium.

*Question* Have you used annealed steel wire for closure of a bronchus in lobectomy and pneumonectomy and do you think it is superior to silk?

*Answer* I haven't used it and I don't think it is superior to silk.

To Dr. Harold D. Green

*Question* What change, if any, blood circulation time takes place in patients upon whom a thoracoplasty has been done? We might assume that it is a complete thoracoplasty, and therefore, a collapse of one entire lung.

*Answer* I think first I should define what might be meant by circulation time in this particular case. The total circulation time as usually measured from systemic vein through the lungs to systemic capillaries might be divided into the circulation time from the periphery to the lungs, the circulation time



## ORGANIZATION NEWS

### CUBAN CHAPTER ELECTS NEW OFFICERS

The Cuban Chapter of the American College of Chest Physicians met at Havana, Cuba, June 26 and the following officers were elected Dr Alfredo Antonetti, President, Dr Francisco J Menendez, Vice-President, Dr R Sanchez Acosta, Secretary-Treasurer Dr Antonio Navarrete, Havana, Regent of the College, gave a report on the Eighth Annual Meeting of the American College of Chest Physicians which he attended at Atlantic City, New Jersey, June 6-8, 1942

### DR WM ATMAR SMITH ELECTED PRESIDENT

Dr Wm Atmar Smith, Charleston, South Carolina, a Fellow of the College and formerly Governor of the College for the state of South Carolina, is the incoming President of the Medical Society of South Carolina

### DR REDFEARN ELECTED PRESIDENT

Dr James A Redfearn, Albany, Georgia, Governor of the College for that state, was inducted into office as President of the Georgia State Medical Society

## BOOK REVIEWS

**THE HEART IN PREGNANCY AND THE CHILD-BEARING AGE** By Hamilton and Thompson Cloth Pub 1941, by Little, Brown and Co 402 pp Price \$5 00

Although there are several books available at this time which cover this subject, this book fills a distinct place because of the amount of well studied material presented and the manner of presentation It is divided into three books, the first dealing with "The Cardiac in Pregnancy," the second with "Physiology of the Circulation in Normal Pregnancy and in Pregnant Women with Heart Disease" and the third with "The Heart Diseases in Pregnancy and the Childbearing Age" Their subject matter and discussions are based upon actual experience in the classification, observations and treatment of several hundred pregnant cardiacs Unfortunately they have chosen to use a classification not in wide use and perhaps confusing, as their group 1 is the most serious and their

group 3 the least, while the more widely used New York classification has a reversal use, Class 1 being the least serious and Class 4 the most aggravated case

They present the customary statistical studies and criteria This is followed by a very complete review of circulatory changes associated with pregnancy in both the normal and the cardiac patient The final book deals with the various types of heart disease that may be present in this age group and cites their experience with each type There is also a short section dealing with the proper method of obstetrical control and after care written by Frederick C Irving

It is the reviewer's opinion that this book is of value, not only to the general practitioner and obstetrician but also to the cardiologist It clarifies many circulatory problems and presents common sense methods of diagnosing, classifying and treating these patients

Homer P Rush, M D

**NEUROANATOMY** Fred A Mettler, A M, M.D, Ph.D C V Mosby, St. Louis, 1941 Price \$6 50

This exceptionally well-written text has succeeded in drawing attention to those general anatomic relationships and concepts which form the basis for the manipulations of practical medicine Its value is enhanced by the deletion of nebulous views and the almost total incorporation of well illustrated available information This present work is divided into two parts, the first of which deals with the topography and morphology of the central nervous system as seen with the naked eye The second part is the microscopic section and concerns itself with the establishment of a sound and usable functional viewpoint The illustrations show that considerable effort has been applied Their clarity and method of design are somewhat unique and on casual observation, it is very apparent that they form one of the attractive features of this text Paramount is the fact that the subject matter is presented in a manner which makes its use imperative in all branches of medicine There is very little doubt but that this book will become a popular standard text and it is without doubt, a valuable contribution to medical literature

Maurice F Snitman, M.D

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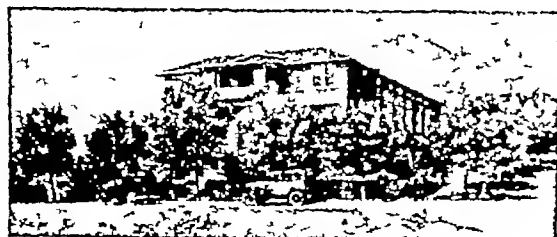
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1 Mason, G. A. "Extirpation of the Lung," *Lancet*, 1 10 47, 1936

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## CONTENTS:

CHEMOTHERAPY OF TUBERCULOSIS AND THE  
MODE OF ACTION OF THE SULFONAMIDE  
COMPOUNDS (Page 166)

Ralph R. Mellon, M.D. Pittsburgh Pennsylvania

TUBERCULOUS TRACHEOBRONCHITIS (Page 172)

William S. Conklin M.D., Portland Oregon

SPONTANEOUS HEMOPNEUMOTHORAX

With Report of a Case (Page 178)

Morris Tannenbaum, M.D. New York, New York

THE PROBLEM OF PULMONARY TUBERCULOSIS  
IN THE NAVY (Page 182)

Lt Comdr E. Risen Washington D. C.

EDITORIAL ORGANIZATION NEWS BOOK  
REVIEWS SANATORIA

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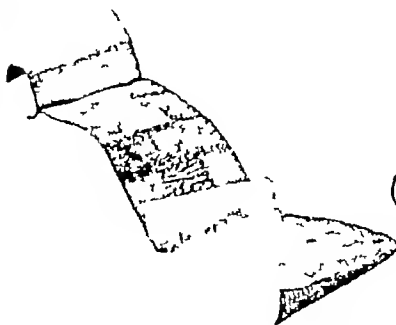
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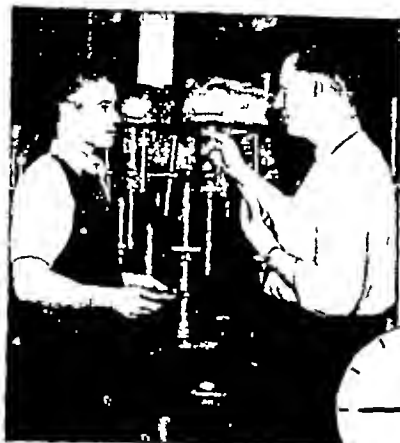
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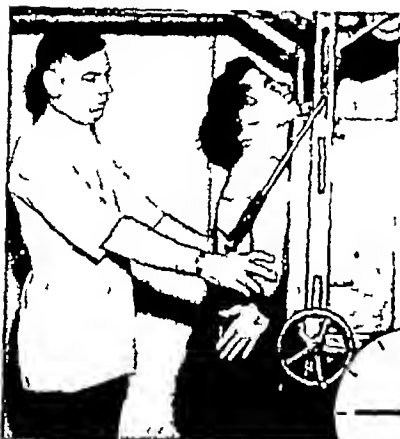
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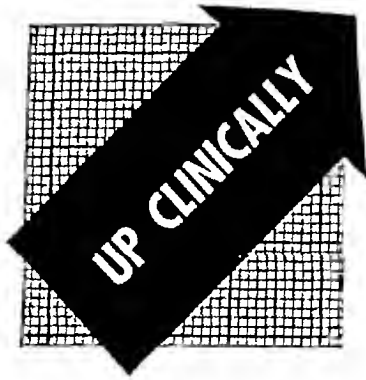
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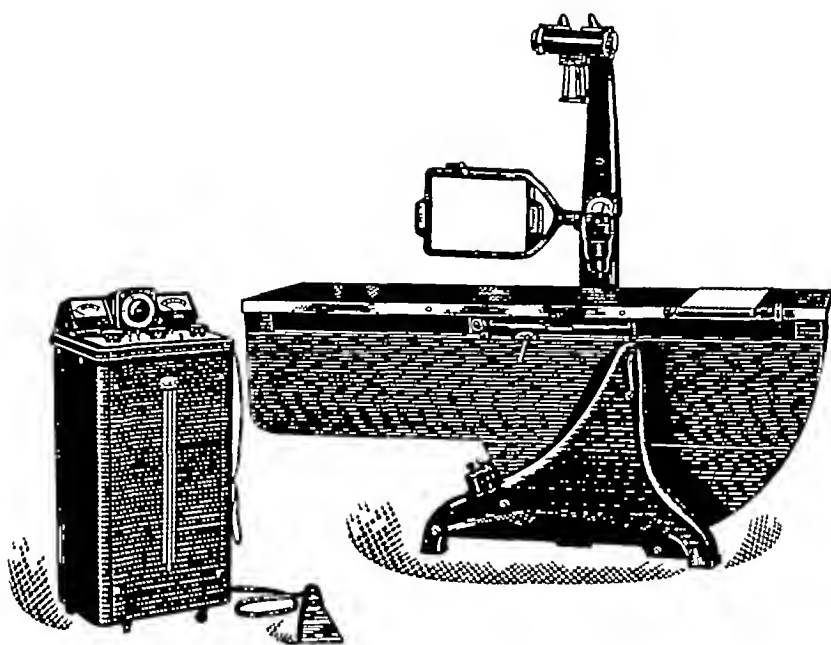


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## Editorial Comment

### Program Highlights

Some of the sessions which are of especial interest to the members of the American College of Chest Physicians, as taken from the program of the College meeting to be held at Atlantic City, June 6-8 are "A Joint Session of the American Broncho-Esophagological Association and the American College of Chest Physicians", "A Discussion of the Tuberculosis Problem from the Viewpoint of the Army, Navy, Veterans Administration, Public Health, and Organized Medicine" "A Luncheon Meeting sponsored by the Council on Undergraduate Teaching in the Medical School" and the "General Scientific Assemblies".

The Joint Session of the American Broncho-Esophagological Association and the American College of Chest Physicians will bring together the bronchologist, the chest surgeon and the internist in an interesting discussion concerning all phases of bronchoscopy.

The discussion of the tuberculosis problem from the viewpoint of the Army, Navy, Veterans Administration, Public Health and Organized Medicine, will be presented to us by Brigadier General Charles C Hillman for the Army, Commander Robert E Duncan for the Navy, Dr Roy S Wolford for the Veterans Administration, Dr H E Hilleboe for the U S Public Health Service and Dr Esmond R Long for the Committee on Tuberculosis of the National Research Council.

The meeting sponsored by the Council on Undergraduate Teaching in the Medical Schools will present the latest developments in the efforts of the College to interest the deans and faculties of our leading medical schools in the advancement of the teaching of tuberculosis and other diseases of the chest to our medical students. Dr E W Hayes Chairman of the Council will bring us a report on the meeting of the Association of American Medical Colleges which he attended as a guest speaker at Richmond

Virginia, last year. Other teachers who will speak at this session will be Dr Jay Arthur Myers Dr A J Cohen and Dr Ralph C Matson

C M H

### Goodwill Ambassadors

This year, the medical meetings to be held at Atlantic City will give prominence to speakers and scientific exhibits from our good neighbors "South of the Rio Grande". We are more than pleased to welcome these grand fellows from our sister republics, who, by their presence, will express to us their deep feeling of comradeship in this great emergency.

The excellent scientific exhibits brought here from the Latin-American countries will be shown in the Scientific Assembly Auditorium at the American Medical Association meeting to be held at Atlantic City, June 8-12. We are happy to announce that some of these exhibits will be shown by Fellows of the American College of Chest Physicians from the Argentine. We are also happy to announce that places on our program will this year be occupied by Fellows of the College from Cuba, Mexico and the Argentine.

These men will travel long distances and endure many inconveniences in order to attend our meetings. It is up to us to show our appreciation to these goodwill ambassadors by making certain that there will be a good attendance at each of the sessions. Our guests will bring to us much beneficial information. We will also have an opportunity to meet and know our neighbors better. Every Fellow and Associate of the American College of Chest Physicians owes it to himself his country, and his College to greet these Fellows at Atlantic City. The dates of the College meeting are June 6-8.

F W B

# Chemotherapy of Tuberculosis and the Mode of Action of the Sulfonamide Compounds\*

RALPH R. MELLON, M.D. \*\*  
Pittsburgh, Pennsylvania

There have been a significant number of papers dealing with the effect of various sulfonamide compounds on the tubercle bacillus. It is not important to refer to more than a few of these because, with the exception of the recent work of Feldman and his associates,<sup>1</sup> their therapeutic effect in experimental animals has not been of a critical nature.

Considered as a whole, the studies preceding Feldman's fall into two groups: first, those claiming a definite degree of protection, and second, those that failed to demonstrate such an effect. Among the latter group of investigators are Steinbach and his co-workers,<sup>2</sup> Kolmer and associates,<sup>3</sup> and Smithburn.<sup>4</sup> In the former category are Rich and Follis,<sup>5</sup> Locke, et al.,<sup>6</sup> and Greey, Campbell and Culley.<sup>7</sup> The discrepancies appear to be accounted for largely by such variables as the size and duration of drug dosage, the intervals between doses, route of administration, etc. The species of animal used for test also plays some part.

The trials were not limited to sulfanilamide. Sulfapyridine, as well as a dodecanoyl derivative of sulfanilamide,<sup>8</sup> and certain acyl derivatives,<sup>9</sup> have also been employed. The most that has been accomplished with these compounds is the demonstration of a growth inhibition on the microorganism *in vivo*, but only as long as administration of the drug was continued. When it was withdrawn, the bacteriostatic effect disappeared.

However, the recent results obtained by Feldman<sup>1</sup> fall into a different category. They employed one of the better known sulfones against a variant of the classical H-37 strain of tubercle bacillus. The trade name of the drug is Promin. Chemically, it is the sodium salt of p,p'-diamino-diphenyl-sulfone-N,N'-dextrose sulfonate. Apparently it is inactive in this form, but when given orally, the

sodium dextrose sulfonate is split off and the original diamino-diphenyl-sulfone is regenerated. This is its active form.

In one series of guinea pigs, administration of the drug was delayed as long as six weeks after inoculation of the organism and a positive tuberculin test was in evidence. The recovery of 7 out of 8 animals of this series proves beyond question that an active progressive tuberculosis was being treated. Indeed, about as large a percentage of animals recovered after a six weeks' interval between inoculation of the organism and administration of the drug, as occurred when both were given on the same day. Moreover, there was an inability of emulsions of their organs to infect fresh pigs on injection.

What may eventuate as an important conditioning feature of the experiments was the modest virulence of the tubercle strain employed. The RV (rough colony, virulent) H-37 strain employed by them is not of the high virulence of the S (smooth colony) phase and this is borne out by the 6-month period required for death of the untreated animals. A conditioning feature of another kind is the rather high toxicity of the drug, which becomes especially important in a chronic disease. Nevertheless, the experiments are sufficiently conclusive to justify therapeutic trials in man which, I understand, are now in progress. The authors are justifiably cautious in the clinical inferences drawn from their experimental work.

## *The Mode of Action of the Sulfonamide Compounds*

We shall center our attention primarily on the drug's impact against the germ itself, inasmuch as the participation of the host's immunity mechanisms, although important, are at best secondary. Of the various hypotheses originally proposed, the ones being sustained by experiment are those connected with sulfanilamide's interference with the respiratory function of the microorganism—in other words, with its enzyme systems

\* Read before the Seventh Annual Meeting of the American College of Chest Physicians, the Hotel Statler, Cleveland, Ohio, June 1, 1941.

\*\*Director, Institute of Pathology, The Western Pennsylvania Hospital, Pittsburgh, Pennsylvania.

The first definite demonstration that an enzyme *per se* might be involved came from the studies of Locke and his co-workers<sup>9</sup> at the Institute of Pathology of the Western Pennsylvania Hospital. At about the same time Lockwood<sup>10</sup> suggested that a protease might be affected, by reason of peptone's interference with the action of sulfanilamide. In its original form, the theory pre-supposed that the free amino group of sulfanilamide had been oxidized to a moderate degree, because such oxidation products have been known previously to have very definite anti-enzymatic properties.

One of the products to which we refer is represented by Fig 2 in the above diagram. Chemically it is a hydroxyl-amine derivative of sulfanilamide (Fig 1). It has been demonstrated that this derivative completely inactivates the enzyme *catalase* and to a certain extent the enzyme *peroxidase*. This would mean that the hydrogen peroxide, a respiratory product that is normally produced by most strains of pneumococci and hemolytic streptococci would not be destroyed, and as a result, the microorganisms would be subjected to the rather considerable toxic action of this substance.

In support of the theory that this might constitute one of the mechanisms involved in the bacteriostatic action of the sulfonamide compounds are certain interesting clinical and experimental considerations. Thus, it has been shown by Shinn for the pneumococcus<sup>11</sup> that the bacteriostatic action of sulfanilamide on a susceptible strain is reduced in proportion as the aerobic conditions are diminished, and correspondingly, peroxide production falls off until under anaerobic conditions none is to be detected.

On the clinical side it is a well-known fact that abscesses and other necrotic foci are notoriously lacking in their oxygen content. Not only is the circulation of such foci seriously impaired, but the broken down products of pus such as the peptone-like substances tend to absorb any oxygen that might otherwise have entry into the focus of the infection. In other words, the local conditions are probably so largely anaerobic as to block effectively any oxidative changes in the sulfanilamide molecule. On the other hand, this evidence in behalf of the oxidative theory is scarcely more than presumptive, because there are other substances in pus which may have an important role to play. Moreover,

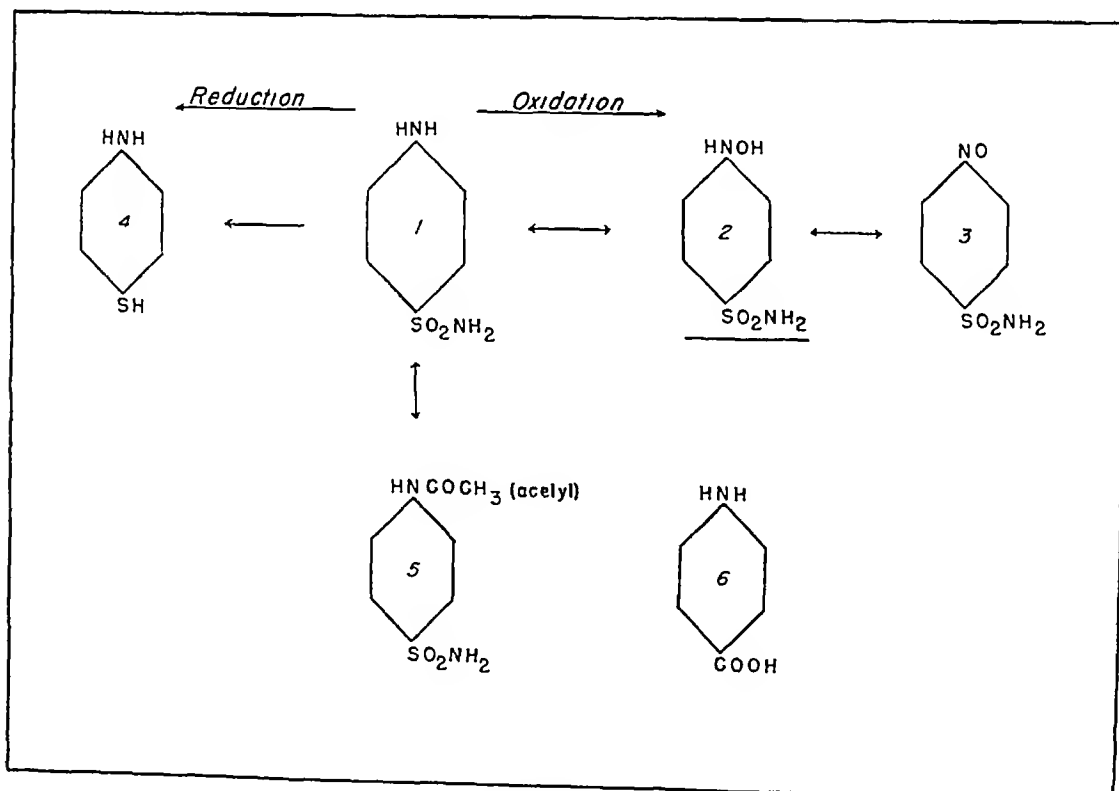


CHART I

It is by no means invariable that bacteriostasis may not take place under strictly anaerobic conditions, as indeed has been indicated in the Shinn experiments just quoted.

The latter point was brought to the fore particularly in the experiments of Broh-Kahn,<sup>12</sup> who showed that the colon bacillus under very stringent conditions of anaerobiosis is vulnerable to the bacteriostatic action of sulfanilamide. Moreover, under these conditions, sulfanilamide caused the poisoning of an oxygen transportase (enzyme), thus indicating that, for the inactivation of certain enzymes oxygenation of sulfanilamide's free amino group was not essential. As additional evidence for the enzyme inactivation theory are the studies of MacLeod,<sup>13</sup> who showed that certain dehydrogenases of the pneumococcus are also inhibited by sulfapyridine. These enzymes are also concerned with the germ's utilization of oxygen in its metabolism.

Furthermore, it is now clear that the clinical acidosis caused by sulfanilamide results from the inactivation of the enzyme carbonic anhydrase. This action is referable to the activity of the  $\text{SO}_2\text{NH}_2$  group of the sulfanilamide molecule rather than to the free amino group (Fig 2, Diagram I). The first indication of such an effect on this enzyme was the work of Locke which was referred to in our paper before the Ohio State Medical Society in May, 1940.<sup>14</sup> However, these experiments could not be completed until some months later.

Meanwhile, a paper by Mann and Kellin<sup>15</sup> appeared on the same subject and Locke's announcement came a few weeks later.<sup>16</sup> Thus, this observation was made independently by two different workers in different countries at virtually the same time, but if the ethics that have previously decided priority considerations continue to be practiced, not only will Mann and Kellin's work receive priority, but Locke's likely will be overlooked.

Despite the fact that there is considerable evidence in support of the oxidative enzymatic point of view, there is developing a gradual accumulation of experimental observations that, for the moment at least, are not to be reconciled with its oxidative aspects. For example, the inactivation of carbonic anhydrase takes place when the free amino group is inactivated by acetylation and

is therefore not susceptible of oxidation (See Diagram I, Fig 5). Furthermore, substituents of the  $\text{SO}_2\text{NH}_2$  group such as thiazole or pyridine prevent the inhibition of carbonic anhydrase, even in the presence of an unblocked free amino group. Accordingly, it is the sulfonamide rather than the free amino group that is involved.

There is also the fact that Type 3, Group A, hemolytic streptococci have not yet been demonstrated to produce hydrogen peroxide and yet they are among the most vulnerable strains to the action of sulfanilamide. Again, the staphylococcus aureus produces catalase, but sulfanilamide is not critically effective against this organism. On the other hand, sulfathiazole is clinically effective and sulfapyridine somewhat less so. One can only infer that if catalase inhibition is involved at all, it is certainly not the only factor contributing to the bacteriostasis. Indeed this evidence is in line with our earlier assessment of the enzymatic theory, which was viewed as having a much broader coverage than its catalase-peroxide aspect.<sup>17</sup>

Nevertheless, it should not be lost sight of that, in localized infections where it is possible to combine the use of  $\text{H}_2\text{O}_2$  and sulfanilamide, curative effects can be obtained in cases that have proved refractory to sulfanilamide alone or in combination with other antiseptic agents. This is strikingly illustrated by Schneider<sup>18</sup> in his report of two cases, one of osteo-periostitis and one of intramuscular abscess. The lesions were flushed out with the peroxide solution containing dissolved sulfanilamide.

In this connection Schneider quotes a pertinent experiment of Fox who found that the bacteriostasis resulting from the addition of small amounts of  $\text{H}_2\text{O}_2$  to cultures of streptococcus hemolyticus containing 10 mgm of sulfanilamide per 100 cc of media, was more than 10 times greater than with corresponding amounts of sulfanilamide alone, and more than 200 times greater than the stasis produced by peroxide alone.

On the other hand, peroxide is capable of oxidizing other substances in wounds in addition to the sulfanilamide, although whether the net effect of such a reaction would help to overcome the infection is not clear. But the experiments of Burton and the McLeods<sup>19</sup> show that the bacteriostatic

effect of the oxidation products of sulfanilamide are much more effective against certain organisms than the unoxidized sulfanilamide

An additional factor of importance appears to have been identified by Coburn and West<sup>20</sup> It was already known from the studies of Knight<sup>21</sup> that in the presence of nicotinic acid, the staphylococcus aureus can synthesize co-enzyme, a factor indispensable for its growth. However, the failure of this synthesis to occur in the presence of sulfapyridine has led Coburn and West to infer that the drug has blocked it. The chemical similarity of the pyridine nucleus with the nicotinic acid and adenine portions of the co-enzyme molecule might well conduce to its interference with the synthesis of co-enzyme, therefore explaining, at least in part, an increased specificity against this organism, over and above the action of sulfanilamide against it.

In this instance apparently, it is not a case of inactivation of the enzyme *per se*, but rather of blocking its action by interfering with its co-enzyme. It represents an application of a concept whose chemotherapeutic applications have been formulated by Fildes.<sup>22</sup> In his terminology the nicotinic acid is an "essential metabolite," because it forms the basis for the synthesis of co-enzyme, to which he refers as a "growth factor."

Fildes and his associates had already worked out a similar situation for the hemolytic streptococcus and for the pneumococcus. In this case the essential metabolite proved to be p-aminobenzoic acid, whose chemical structure is shown in Diagram I, Fig. 6. It is seen to be strikingly similar to sulfanilamide, thus conducing to its chemical competition with the drug.\* The fact that in the presence of p-aminobenzoic acid the bacteriostasis of sulfanilamide is dispelled is most significant and the evidence accumulating in behalf of this theory of the mode of sulfanilamide's action is indeed impressive. Although this reaction is demonstrated most readily in the test tube, it is also capable, apparently, of taking place *in vivo*. For example, mice which have been infected by streptococci, but given p-aminobenzoic acid

at the same time, die in the presence of an otherwise curative dose of sulfanilamide.<sup>24</sup>

Locke,<sup>9</sup> who formulated the peroxide theory, is of the opinion that an important aspect of the competition between sulfanilamide and para-aminobenzoic acid consists in the greater affinity of the latter for  $O_2$ . In such event, it would deprive sulfanilamide of the oxidation considered necessary for its activation. Only experiments directed to this point could establish its validity. Again, it is conceivable that the two points of view supplement each other. That is to say, the entry of sulfathiazole into the co-enzyme molecule might involve the oxidation of its free amino group. Here, again, experimental demonstration is required if the necessary reconciliation between the somewhat different mechanisms of enzyme inactivation is to be brought about.

The aspect of the enzyme-blocking point of view that appeals particularly to the author is the plausibility of the explanation that it offers for specificity differences. This has been partially accounted for above, in the increased action of sulfapyridine over sulfanilamide in staphylococcus aureus infections. A somewhat general similarity between the sulfapyridine and sulfathiazole molecules makes it probable that the same explanation also holds in the case of the latter. Indeed sulfathiazole is usually critically effective against staphylococci which cannot be said of sulfapyridine. This effect may in turn find explanation in the fact that sulfathiazole actually stimulates the respiration and possibly the local resistance of the tissues against this organism, as will be discussed presently.

If this rather brief review of what is known at the present time of the biochemical aspects of the mode of action of the sulfonamide compounds does nothing else, it should impress one with the complexity of the biochemical considerations involved. Indeed, it has been rather obvious from the beginning that no one simple explanation was destined to explain the mode of action of these drugs, particularly when it became clear that their respiratory mechanisms were probably primarily concerned. However, as time goes on, it becomes clearer that the growth inhibition, which is the keynote of the drugs' action, is to be thought of as a starvation

\* On the other hand, Bliss and Long<sup>23</sup> in a recent paper show that structural similarity is not essential to competitive action, for methionine shows a marked antagonistic action toward sulfanilamide.



process. Thus the bacteria are denied essential food substances, either indirectly, as by the blocking of an enzyme, or directly by enzyme inactivation.

*The Biological Responses of the Micro-organism to Sulfanilamide*

As far as the effect on the organism itself is concerned, the starvation process results in important changes in the virulent growth phase of the organism, whereby it is gradually deprived of this important property. Such deprivation finds expression in transformation of the organism to a succession of phases represented in the following diagram.

The mucoid organism represented by the circle to the left is the phase of highest virulence, but under the impact of the drugs' action there results a succession of phases which are identified in part by the morphologic alterations indicated in the diagram. The organism finally loses its capsule as indicated by the Neufeld negative reaction, at which time its virulence also disappears. Accompanying these morphologic changes is a progressive loss of its metabolic functions in reference first to its characteristic ability to

produce methemoglobin, and second to ferment inulin, and third to produce hydrogen peroxide.

Significantly, too, as soon as these changes are initiated, the invasive characters of the bacteria are seriously interfered with and they become phagocytatable, even while they are still encapsulated. The long chained forms, especially, have their metabolic balances so seriously disturbed that they often undergo autolysis.

These changes are reinforced considerably by the serum antibodies, as well as by the phagocytic ability of the host and the general forces of natural resistance that may be said to lie behind them. These latter Locke<sup>25</sup> has shown to be quite distinct from the antibodies *per se* and to be considerably under the influence of vitamins, particularly B<sub>1</sub> and C.

*Factors of Natural Resistance in Chemotherapy*

Quite distinct from the antibodies, the phagocytes, etc., are resistance forces whose nature is much less specific. Indeed, they are physiological or nutritional, being much influenced by certain vitamins and hormones.

*Diminishing gradient of virulence and of the following metabolic functions of the "dissociants"*

*1 Methemoglobin 2 Inulin fermentation  
3 H<sub>2</sub>O<sub>2</sub> production*

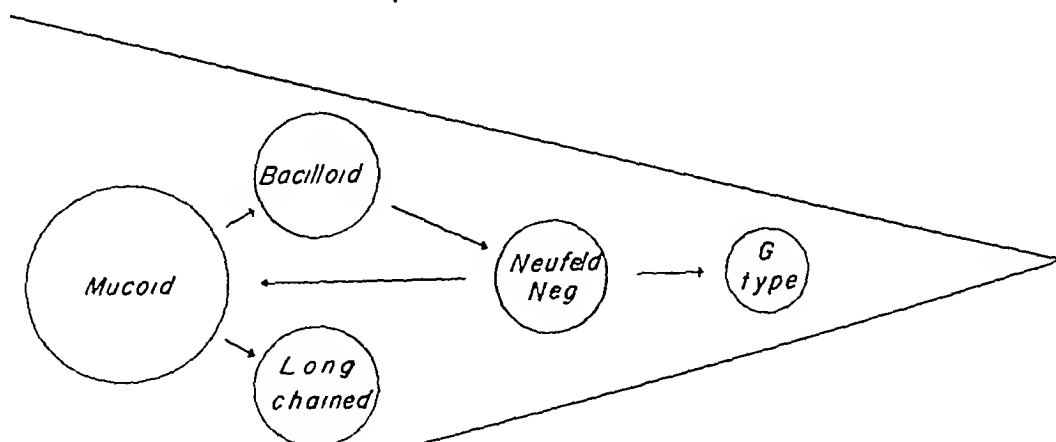


CHART II

Their effect in resistance against the pneumococcus is measurable by the rate at which the host can consume oxygen. However, there is an optimum range as can be demonstrated in the rabbit, for example.

Thus highly virulent pneumococci injected into a rabbit in the optimum range, are quickly removed from the circulation, whereas an animal varying much from this optimum in either direction will usually die of sepsis. Certain hormones, cortin particularly, and such vitamins as  $B_1$ , can reinforce this general resistance state very effectively as has been shown by Locke.

This fact gave us the idea originally of joining chemically vitamin  $B_1$  to sulfanilamide, but this not being feasible, its thiazole nucleus was combined for us by Fosbinder and Walters<sup>26</sup> of the Maltbie Chemical Company of Newark, New Jersey. Whether the superiority of sulfathiazole over sulfanilamide against the pneumococcus, staphylococcus, etc., will find its entire explanation in its increase of tissue resistance (as measured by increased oxygen consumption, etc.) is doubtful, especially in view of the specificity trend shown in the experiments of West and Coburn.<sup>20</sup>

Nevertheless, experiments at present being conducted by us indicate that for certain tissues (Warburg technique) sulfathiazole produces a very appreciable increase in oxygen uptake, in contrast to sulfanilamide which in higher concentrations, depresses their normal rate of respiration, and in lower concentrations does not stimulate. There are numerous clinical instances coming to our attention where patients with low-grade infections have been cured with long-continued, but small, doses of the drug.

Finally, we wish to emphasize again that, in concentrating our attention in the beginning on the catalase-peroxydase system of enzymes, we had no intention whatever of attempting to limit the effect of the several sulfonamides' action to this one enzyme system. This, unfortunately, has been the unwarranted assumption of some writers.

#### Summary and Conclusions

In one of the sulfones is to be found the first chemotherapeutic agent against tuberculosis that has sufficient promise experimentally to justify a thorough-going trial

clinically.

As regards the difficult problem concerning the mode of action of the sulfonamide compounds generally, it is becoming clearer that their biochemical effects are such as to interfere with the nutrition of the bacteria.

This they do by damaging their enzyme systems. Theoretically, this can come about in at least two ways, they may inactivate certain enzymes *per se*, or they may block enzyme action by interfering with the co-enzymes.

Thus, the catalase-peroxydase system of enzymes can be inactivated by certain intermediate products of the oxidation of sulfanilamide. Hydroxylamine, or some related form, is perhaps the best example of this possibility.

On the other hand, sulfathiazole, presumably by virtue of the chemical constitution of its thiazole group, can interfere with the synthesis of co-enzyme, a growth factor indispensable for the nutrition of the staphylococcus. Inasmuch as we are dealing with oxidation-reduction mechanisms, it is conceivable that these separate biochemical functions are complementary, at least in some instances. However, there is as yet no direct evidence on the point.

Anti-enzymatic action is likewise responsible for certain of the toxic effects of these drugs. Thus, the acidosis produced by sulfanilamide is referable to the inhibition of the enzyme, carbonic anhydrase, while the cyanosis is referable to a similar, if not identical, effect on hemoglobin. That is to say, it is partially oxidized to methemoglobin by the toxic  $\text{NO}_2$  and  $\text{NO}$  derivatives of the free amino group of sulfanilamide.

Finally, certain of the sulfonamide compounds, such as sulfathiazole, seem capable of stimulating the rate of oxygen consumption of the body tissues, either as a whole or, in some instances, individual tissues. This all suggests that the effect of sulfathiazole on localized infections and on wound healing where no infection is involved, is due in part to an increase in tissue resistance.

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# Tuberculous Tracheobronchitis\*

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During the past two years approximately five hundred bronchoscopies have been performed on some two hundred patients in the University State Tuberculosis Hospital. Since July 1, 1940, bronchoscopy has been used as a routine diagnostic procedure without a single misadventure, for the vast majority of patients admitted to the hospital. It has been omitted or deferred only in a comparatively small group of patients in whom the procedure obviously would be of no diagnostic value or assistance, including those with no evidence of active pulmonary disease, very early cases with negative sputum and gastric wash, and very far-advanced, untreatable or terminal cases. The only contraindications which we have had occasion to respect were extreme illness, recent hemorrhage, and active laryngeal tuberculosis.

A few cases with retrogressive, quiescent, or inactive laryngeal tuberculosis have been bronchoscoped. These have included cases in which a persistent though inconstant posi-

tive sputum could not satisfactorily be accounted for on the basis of existing demonstrable lesions in the larynx or pulmonary parenchyma, a case that was bronchoscoped through a tracheotomy opening and a case which has twice been bronchoscoped for acute postoperative atelectasis. The laryngeal lesions have not been adversely affected in any of these cases.

The value and purposes of bronchoscopy in pulmonary tuberculosis are manifold. While recent hemorrhage is a contraindication which should not be disregarded, there is an occasional case in which determination of the source of hemoptysis is sufficiently important to outweigh the presumptive dangers of bronchoscopic examination. We have used bronchoscopy on two occasions for this purpose. In one case no information was forthcoming, in the other the blood was traced directly to the left upper lobe bronchus. In neither case was the severity of hemorrhage increased by the procedure.\*

Bronchoscopy may also be useful when the

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\* Recently a 15 year old girl was admitted as an emergency with profuse pulmonary hemorrhage. Portable radiograms revealed cavitation in the left upper lobe and atelectasis of the left lower. Bronchoscopy was considered indicated in an attempt to overcome the atelectasis and prevent further tuberculous extension by aspiration of blood clots and infected material from the bronchi.

source of a positive sputum is obscure. I am referring here to cases in which no specific lesions of the trachea or major bronchi exist. While one cannot strictly rely on specimens taken from individual bronchi through the bronchoscope, because of the danger of contamination, we have one case in which a right pneumothorax appeared completely effective and a previous lesion in the left lung had apparently disappeared, yet the sputum remained positive. Smears taken through the bronchoscope were negative on the right, but on the left revealed tubercle bacilli. Therefore, a left pneumothorax was induced and immediate sputum conversion resulted.

The symptoms of tuberculous tracheobronchitis are now well recognized. Their existence even in a case of pulmonary tuberculosis, however, is not necessarily diagnostic. We have one case in which bronchoscopy ruled out the presence of tracheobronchial lesions sufficient to cause the signs and symptoms observed. This case had a complicating "bronchial asthma." More frequently we see cases who have long been treated on an allergic basis when their asthmatic symptoms were caused by tuberculous lesions alone.

We have occasionally employed bronchoscopy in determining the presence, extent and location of bronchiectasis, both tuberculous and non-tuberculous. Selective iodized oil fillings of individual lobe bronchi may be accomplished very satisfactorily under bronchoscopic guidance. We have further employed bronchoscopy for drainage and insufflation of medications (e. g. sulfathiazole) in cases of bronchiectasis, and for aspiration of blocked secretions.

Bronchoscopies have been employed at the University State Tuberculosis Hospital primarily to determine the presence or absence of tuberculous tracheal and bronchial lesions and for the purpose of treating these when they exist.

The introduction of bronchoscopic examination as a part of the routine work-up in this hospital evolved from the feeling that an exact knowledge of the entire respiratory system, including the tracheobronchial tree, was important to a complete evaluation of the patient's condition and to the institution of the most appropriate treatment program. So far as I have been able to determine no one yet has recommended bronchoscopy

as a routine procedure in active pulmonary disease. Many have considered active pulmonary tuberculosis a specific contraindication to bronchial endoscopy, others consider it indicated when, and *only* when definite signs and symptoms of tracheobronchial disease exist. McIndoe<sup>1</sup> and others reported on the use of routine bronchoscopy at the Michigan State Sanatorium between September, 1935, and April, 1937, and concluded that routine bronchoscopic examination is not necessary. It may be a long time before bronchoscopy is generally accepted as a routine diagnostic procedure in pulmonary disease. Possibly such a time will never occur. Our early experiences lead us to believe that it should and will.

Our reasons for the belief that routine bronchoscopy is of value will be covered in the report that follows. Among two hundred bronchoscope patients who were admitted to the University State Tuberculosis Hospital with a diagnosis of pulmonary tuberculosis, there were fifteen in whom bronchoscopy helped to prove the absence of any significant tuberculous involvement, eight of these had a non-tuberculous bronchitis or peribronchitis, three had bronchogenic carcinoma, two had non-tuberculous bronchiectasis, one had metastatic pulmonary malignancy, one was later found to have Hodgkin's disease. There were also two cases in which bronchoscopic findings suggested that pressure from tuberculous tracheobronchial lymph nodes were responsible for the patients' symptoms.

Another case of bronchogenic carcinoma should also be mentioned here. This forty-six year old man was admitted with a positive sputum. While his x-ray was not typical of purely tuberculous involvement, it did reveal a small thin-walled cavity, and it is quite probable that discovery of the malignancy would have been delayed had he not immediately been bronchoscope as a routine procedure. The bronchoscopic examination revealed a very small but suspicious mass in the dorsal branch of the right lower lobe bronchus. A biopsy diagnosis of epidermoid carcinoma of the bronchus was made. The discovery of an occasional operable case of bronchogenic carcinoma lends considerable weight to the argument for routine bronchoscopy.

So much has recently been written about

tuberculous tracheobronchitis,<sup>2-15</sup> its pathogenesis, its signs, its symptoms, that it would certainly be superfluous to repeat a formal or conventional discussion of this subject. The primary purpose of this paper is to present our findings, results and such conclusions as one may draw.

The pathogenesis of tuberculous tracheobronchitis has been ably discussed by many authors including Reichle and Frost,<sup>16</sup> Myerson<sup>15</sup>, and Bugher, Littig and Culp.<sup>4</sup> According to Myerson,<sup>15</sup> the tracheobronchial lesions occur solely as a result of direct extension from the pulmonary focus by way of the bronchioles and bronchial submucosa. Since the lesions occur far more frequently in women than in men, who presumably are able to expectorate more efficiently, since the lesions usually occur on the posterior wall of the trachea and bronchi, where contact with infected secretions in the recumbent patient is likely to be more prolonged, and since we occasionally have seen isolated ulcers and tubercles, and these almost exclusively in women—we have come to believe that implantation or contact infection does occur.

There is an extraordinary variance in the incidence of tuberculous tracheobronchitis as reported by various authors. Bugher, Littig and Culp<sup>4</sup> found tracheobronchial lesions in 41 per cent of 122 autopsies. Flance and Wheeler<sup>17</sup> found evidence of gross involvement in only 31 per cent of 285 autopsied cases of pulmonary tuberculosis. McIndoe and his co-workers<sup>1</sup> found active or healed lesions in 11 per cent of 272 routine bronchoscopies. Hawkins<sup>8</sup> found gross bronchoscopic evidence in approximately 25 per cent of 516 selected patients at Olive View.

I have divided our cases into groups according to bronchoscopic findings. The first, or "bronchitis" group, consists of all cases in which the picture was primarily that of diffuse inflammation associated frequently with edema or infiltration of the mucous membranes. This rather heterogeneous group includes probably some cases whose membranes had become reddened merely as a result of cough or instrumentation. In others the inflammatory changes might be considered the result of a complicating non-specific bronchitis or a specific allergic reaction to the tuberculo-protein present in the sputum. Some of this group certainly represent the specific

submucosal infiltrations which, according to Myerson,<sup>15</sup> are always precursors to the ulcerating or granulomatous lesions which may follow. The second, or ulcerogranuloma group, includes all those which presented active ulcerating or granulating lesions which might well be the source of tubercle bacilli in the sputum. The third group includes those in whom only fibrotic stenoses, presumably healed tuberculous lesions, were found.

In routine bronchoscopies of one hundred seventy tuberculous patients fifty-four, or 32 per cent, were classified in the first group, forty-nine, or 29 per cent, had ulcerogranulomas, and four, or 2 per cent, presented fibrotic lesions only. The remaining sixty-three (37 per cent) had normal findings in the visible portions of the tracheobronchial tree.

Our figures do not present a true picture of the incidence of tuberculous tracheobronchitis since a good many cases have been referred to us because this complication had already been diagnosed or suspected. It is also true that in a hospital dedicated primarily to the surgical treatment of tuberculosis the incidence of all tuberculous complications is likely to be high. However, realizing that many of the patients classified in our "bronchitis" group actually had tuberculous lesions in the bronchi, we are surprised to find the percentage of positive cases so much higher than in any other series reported, higher even than in those wherein patients have been selected for bronchoscopy only when suggestive signs or symptoms had previously been found.

There is no question that a clinical diagnosis of tuberculous tracheobronchitis can be made frequently and unmistakably. A persistent audible wheeze in the presence of active pulmonary tuberculosis is practically pathognomonic. The generally accepted diagnostic or suggestive symptoms and findings include the following:

- 1) Audible respiratory wheeze (this usually persists after all sputum has been raised. It is frequently very annoying to the patient who describes it as a rattling or gurgling. It may sometimes be heard across the room and is best elicited by auscultation in front of the open mouth of the patient.)

- 2) Parasternal or substernal discomfort (the patient may complain of choking, pull-

ing or painful sensations and inability to take a deep breath. He usually can relate these sensations directly to the involved area.)

3) Difficulty in raising sputum (the sputum is often extraordinarily viscid and tenacious)

4) Asthmatoïd attacks or dyspnoea more marked than the pulmonary pathology would lead one to expect

5) Capricious temperature elevations

6) Cyanosis

7) Parasternal rhonchi

8) Signs of atelectasis or emphysema

9) Marked variation in daily sputum volume or bacillus content

10) Persistent or occasionally positive sputum in spite of well controlled parenchymal disease

11) Bronchographic evidence of bronchiectasis, bronchial stenosis or ulceration

12) X-ray evidence of "blocked" or "tension" cavities

13) Atelectasis or emphysema as demonstrated by x-ray

14) Hemoptysis, positive sputum or bronchogenic spread in the absence of pulmonary cavitation

That the above criteria are not entirely reliable in the diagnosis of tuberculous lesions in at least the bronchoscopically visible portions of the tracheobronchial tree is suggested by the fact that nearly 40 per cent of our positive cases complained of no symptoms, and at least 10 per cent presented no suggestive physical or roentgenographic findings whatever. On the other hand, 25 per cent of the negative cases had symptoms, usually mild, and 50 per cent had one or more of the suggestive findings listed above. Reliance on the usual signs and symptoms of tuberculous tracheobronchitis will result in diagnostic errors in both directions.

That tuberculous tracheobronchitis has a definite deleterious influence on the course of pulmonary tuberculosis is corroborated by our findings which are summarized in the following chart

	Stage of Disease			Sex	
	I	II	III	M	F
Negative	8%	24%	68%	51%	49%
Bronchitis	8%	22%	70%	39%	61%
Ulcerogranuloma	4%	35%	61%	31%	69%

Present Status of Known Cases

	Sputum		Imp	Unch	Worse	Dead
	+	-				
Negative	40%	51%	70%	19%	2%	9%
Bronchitis	58%	36%	68%	15%	11%	6%
Ulcerogranuloma	71%	16%	50%	30%	7%	13%

The prognosis of tuberculous tracheobronchitis has been considered extremely grave. Samson and co-workers<sup>5</sup> reported death in 52.9 per cent of ulcerative and stenotic cases, followed one or more years, or until death, with recovery in none. Jenks<sup>10</sup> stated that about 50 per cent die within one year of diagnosis. Our own experiences fail to corroborate such figures.

Since many of our patients have responded well to treatment we are in agreement with some of the more recent literature which indicates that the prognosis of tuberculous tracheobronchitis is not nearly as grave as the earlier reports suggest. It is, nevertheless, a very serious complication in that it may produce incapacitating symptoms in individuals who are otherwise in good general health. It may predispose the patient to serious and fatal complications such as empyema, bronchiectasis, atelectasis and bronchogenic spread. It may give rise to a small amount of positive sputum in patients who are clinically well. It is difficult or inadvisable to institutionalize such cases indefinitely since they are able and anxious to lead productive lives, and one hesitates to devote to them the hospital beds which are so much in demand. On the other hand, when at large, they constitute the true tuberculosis "carrier," a source of danger to others and also to themselves.

Various types of treatment have been recommended for tuberculous tracheobronchitis. They include topical applications of silver nitrate (5-35 per cent),<sup>8, 10, 11</sup> electrocoagulation,<sup>7, 18, 19</sup> mercury vapor lamp,<sup>20</sup> x-ray<sup>5, 6</sup> and radical surgery (pneumonectomy).<sup>21, 22</sup>

We have had very satisfactory results in many cases with the use of silver nitrate (10-25 per cent). Electrocoagulation, we feel, is likely to produce excessive scarring with resultant stenosis. We have had no experience with irradiation therapy or pneumonectomy in these cases. We find that most isolated lesions will heal promptly following one

or more applications of 25 per cent silver nitrate. The greatest problem exists in the cases where considerable narrowing of the airway already exists at the time of diagnosis. It is our practice now to use 10 per cent silver nitrate for ulcero-granulomas producing, or bordering on, a stenosis, feeling that the more dilute solution is less likely to increase the fibrotic narrowing. Occasionally, when the active lesions have subsided, an attempt is made to dilate any remaining stenosis by the use of metal bougies. While mechanical dilatation and aspiration of retained secretions have undoubted value,<sup>23</sup> the results are usually temporary and the procedures may have to be repeated periodically.

Twenty-six cases of the ulcerogranuloma group received one to twenty-one topical treatments with 10-25 per cent silver nitrate. In four of these complete resolution of the lesions occurred. In fifteen there was apparently complete healing of the ulceration and granulation tissue, but more or less inflammation or fibro-stenosis remained. Six others showed improvement with or without stenosis, one remained unchanged, and none were worse. Of twenty-three cases who received no topical treatment, nine were bronchoscoped more than once over periods of one to twelve months. Of these, two showed complete healing, one was healed with residual stenosis, one was improved, two were unchanged, and three were worse.

Of nineteen untreated cases, four now have a negative sputum and three are dead. Of twenty-three treated cases, seven now have a negative sputum and two are dead—one of the latter having been in good general health with negative sputum for the four months immediately preceding her death. The present status of the seven remaining cases is not known.

In classifying and analyzing our findings some of the numbers become so small that they are of dubious statistical value. However, the general impression which we have gained, both through observation of our patients and review of our results, leads us to believe that topical treatment of the ulcero-granulomatous lesions is definitely worthwhile.

There is yet another aspect to the problem of tuberculous tracheobronchitis. The question has often been raised as to whether

collapse therapy for pulmonary tuberculosis is contraindicated in the presence of this complication.

Samson,<sup>5</sup> in 1937, wrote "Because of the obviously poor prognosis we do not now recommend any type of collapse therapy for patients with ulcerative tracheobronchial lesions unless subsequent bronchoscopic examinations demonstrate a tendency for the ulcers to heal without the formation of an important stenosis." Eloesser<sup>21</sup> has said that collapse may be considered in total stenosis of a mainstem bronchus if the patient is afebrile and not toxic. In such a case collapse is particularly valuable in relieving complaints due to anatomical displacement. Jenks<sup>10</sup> believes that some form of permanent collapse (thoracoplasty) is preferable to a collapse procedure which is intended to be temporary (pneumothorax). Alexander<sup>24</sup> recommends the use of thoracoplasty in these cases only when bronchoscopic observation over a period of 3 months indicates that the tracheobronchial lesions are not progressive. It certainly is true that complete and permanent atelectasis is more likely to occur when pneumothorax is used in these cases, with the result that the pneumothorax must be maintained indefinitely and an excessive reduction of vital capacity results. Our experiences also indicate that tuberculous empyema more frequently complicates a pneumothorax when tuberculous bronchial lesions are present. I have insufficient evidence to substantiate the possible cause and effect relationship. The hazard of tuberculous empyema, if its likelihood can be proven, is certainly serious enough to contraindicate the use of artificial pneumothorax in these cases. While almost all of our cases who have had sputum conversion were treated by pneumothorax or oleothorax, associated with bronchoscopic applications, the majority had had pneumothorax induced prior to the discovery of the tracheobronchial complication. In practically every instance one can foresee that re-expansion of the lung will prove impossible. On the other hand, we do not yet have any evidence that other forms of collapse therapy may prove more consistently successful in these cases. By reducing the tussive force and permitting bacillus-laden sputum to remain longer in contact with the mucous membranes, it is possible that collapse therapy en-



hances the production and propagation of bronchial and tracheal lesions. This cannot be considered a contraindication to collapse of large parenchymal cavities and progressive pulmonary disease. It may well cause us to postpone collapse of non-excavating lesions. A number of our most serious cases had no evidence of cavitation when collapse therapy was instituted.

In conclusion, I would like to emphasize the value of bronchoscopic examination in pulmonary tuberculosis. It is our impression that it has proven itself of inestimable value both in diagnosis and in treatment. Serious and fatal complications of bronchoscopy in tuberculous patients have been reported. Samson<sup>5</sup> reports three cases in whom tracheotomy was necessary for post-bronchoscopic laryngeal edema. All of them died. In a pathological conference at Sea View Hospital<sup>25</sup> is reported a case where instrumentation resulted in freeing of bacillus-laden caseous material which was aspirated into the "good" lung and followed by rapid bronchogenic spread and death. We feel that in proficient hands, with a well-trained, cautious operating force, the dangers of bronchoscopy in tuberculosis are minimal. More than five hundred bronchoscopies have now been performed at the University State Tuberculosis Hospital on patients from two to seventy-one years of age. In not one single instance has the procedure been harmful in any way to the patient's welfare.

It is my fervent hope that routine bronchoscopies in this and in other institutions will lead us to a better understanding of tuberculous tracheobronchitis. Through periodic examination of cases of pulmonary tuberculosis a knowledge of the pathogenesis, evolution and response to treatment of this condition will be gained. And, eventually we may expect to discover the most effective methods for managing cases of pulmonary tuberculosis in which this distressing complication exists.

#### Summary

From experiences with five hundred bronchoscopies at the University State Tuberculosis Hospital the following conclusions have been drawn:

1) Pulmonary tuberculosis per se is rarely, if ever, a contraindication of bronchoscopy.

2) Bronchoscopic examinations afford valuable diagnostic information in pulmonary tuberculosis.

3) The incidence of specific tracheobronchial lesions in pulmonary tuberculosis is higher than generally recognized.

4) Tracheobronchial lesions are not of such grave prognostic significance as some authors have led us to believe.

5) Topical applications of silver nitrate solution in dilutions of 10 to 25 per cent appear useful in promoting resolution and healing of the tuberculous lesions found in the trachea and major bronchi.

6) The information to be gained from bronchoscopy, bronchography and cavity pressure studies will doubtless prove important in determining the most rational course of therapy for the individual tuberculous patient. Many failures not only may be anticipated but also may be avoided if, recognizing their indications, these procedures are judiciously employed.

7) The use of routine bronchoscopies in tuberculosis institutions is recommended in order that our understanding of tuberculous tracheobronchitis may be improved and in order that we may determine the most rational management of cases of pulmonary tuberculosis in which this complication exists.

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## Spontaneous Hemopneumothorax With Report of a Case

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Idiopathic spontaneous hemopneumothorax is a rather uncommon condition. A comparatively small number of cases is found reported in the literature. No doubt more cases have been found, but have not been reported either because there was hesitation in reporting a single case or because a busy chest service may find several cases after an earlier reported case, and would not report these. Some cases, in all probability, have gone unrecognized and have possibly been diagnosed as spontaneous pneumothorax with an effusion. Thoracentesis would have shown the correct diagnosis.

Pitt,<sup>1</sup> in 1900, is usually considered the first to report a case. He stated that there was no reference to this condition in any previous literature of this country or Europe. Hopkins<sup>2</sup> believes that Laennec<sup>3</sup> was the first to describe this condition, although the latter incorrectly assumed the presence of air in the pleural cavity to be due to a by-product of blood decomposition. In 1935, Frey<sup>4</sup> reported a case, and a review of the literature for the previous 34 years revealed only 13 cases. In 1937, Hopkins reviewed the literature and found 43 cases, to which he added three of his own cases, one being the first hemopneumothorax found in a woman. Since then, several additional cases have been reported in American and foreign literature.<sup>5,6</sup>

7 8 9 10 11 12 Louna<sup>13</sup> presented five cases and one autopsy. Wiener and Jackson<sup>14</sup> had a case of thoracoplasty with spontaneous hemopneumothorax on the contralateral side. The hemopneumothorax occurred in about equal instances on the left and on the right side. Almost all the cases occurred between 20 and 40 years of age, and overwhelmingly in the male.

The cause of this condition is quite controversial. Kjaergaard<sup>15</sup> believed the condition was brought on when a ball-valve mechanism existed in a vesicle causing a gradual increase in pressure and eventual rupture. This would not seem to explain the massive hemorrhage usually found since the vesicle walls are thin and only very small vessels are found here. Hopkins presents the theory that the collapsing lung in the formation of a pneumothorax tears the pleural adhesions, containing blood vessels. This would explain the early hemorrhage and also why some have a late appearance of hemorrhage after pain. Large early hemorrhages occur when large vessels are torn. The late appearance of hemorrhage after pain is to be explained by assuming that the first pain is due to rupture of a bleb and the subsequent sharp pain is due to ripping of an adhesion containing blood vessels. Yet, the case reported by Jones and Gilbert<sup>16</sup> came to autopsy on

the 38th day, and the site of bleeding could not be found. Louria's case at autopsy also did not reveal the source of bleeding, although there was found a ruptured emphysematous bleb.

Cummer<sup>17</sup> felt this so-called idiopathic condition was the result of latent non-demonstrable tuberculosis. Weber<sup>18</sup> believed the condition resulted from a rupture of a minute superficial emphysematous bleb adherent to the parietal pleura, and itself resulting from a healed tubercle.

We see on thoracoscopy, in cases of spontaneous pneumothorax, a lung with superficial blebs, often in the upper lobe. Several of these blebs may or may not be attached to an adhesion from the parietal pleura. Certainly it would seem logical in cases of spontaneous hemopneumothorax to assume the bleeding to result from torn vessels lying in the adhesions.

Spontaneous hemopneumothorax has also been reported by Agullar et al<sup>19</sup> in lymphatic leukemia, by de Barrin<sup>20</sup> in pulmonary metastasis of sarcoma, and by Raimondi et al,<sup>21</sup> Dufourt et al<sup>22</sup> and Beatty<sup>23</sup> in pulmonary tuberculosis.

The onset of this condition is usually quite dramatic. Sudden chest pain is the first symptom and the amount of the accompanying respiratory distress depends upon the rate the air enters the pleural space. Where the tear is comparatively large and a ball-valve mechanism is present, the displacement of thoracic organs is early and pronounced. The pain is local at first and then becomes diffuse, extending even to the abdomen. Hemorrhage may be prompt or delayed, and the degree of shock varies with the degree of hemorrhage. The pallor of the patient is marked and the skin is cold and clammy. In most instances, the patients had apparently been in good health, complaining possibly only of a slight cough. The condition manifested itself regardless of exertion, usually during mild activity.

So pronounced have been the symptoms in some cases that they were thought to have been caused by abdominal pathology. Milhorat's<sup>24</sup> case simulated appendicitis. So did the one of Jones and Gilbert. Fischer's<sup>25</sup> case was operated on for a ruptured duodenal ulcer but no abdominal pathology was discovered. A thoracentesis cleared the diag-

nosis. Frey's case was thought at first to be an acute gall bladder. Hurxthal<sup>26</sup> reported a case who presented a rigid, tender abdomen so that surgical intervention was considered.

Abdominal rigidity is probably due to basal pleurisy. Unless a careful physical examination is made, the diagnosis will be missed. The finding of a patient in shock, with a history of sudden pain over the left precordium may also make one think of a coronary occlusion. Sloer<sup>27</sup> presented such a case.

Physical examination reveals the immobile, ballooned hemithorax with hyper resonant percussion and absent breath sounds. Distant amphoric breathing may be heard, accompanied by whispered pectoriloquy. At the base, there is flatness because of the fluid. The speed with which this accumulates is much more rapid than in simple effusion. The uninvolved lung presents exaggerated breath sounds.

The insult to the pleura both by the rupture of the bleb and the escaping blood into the pleural space causes the formation of some pleural effusion. The effusion prevents the blood from clotting because it undoubtedly contains anticoagulants. It has long been known that blood in the pleural cavity does not clot. In my case, the aspirated blood did not clot or change viscosity standing in a beaker at room temperature for over three days. I sent the first specimen of clear pleural effusion from case of pulmonary tuberculosis to Dr. Harry Wallerstein, a hematologist, for experimentation. He reported back that the addition of the pleural fluid to fresh, uncitrated blood prevented it from clotting. This proved that pleural fluid contains anticoagulants and must be present in a hemopneumothorax.

Head<sup>28</sup> writes that when blood escapes into the pleural cavity, normal cardio-respiratory physiology is attacked from several angles. Progressive decrease in blood volume is complicated and aggravated by collapse of the lungs and by pressure upon the heart and great veins. Either of those conditions may cause death. Combined, they supplement each other. Hemorrhage produces (1) progressive decrease in blood volume, (2) progressive decrease in cardiac output, (3) progressive fall in blood pressure, (4) shock from lack of oxygen supply to the vital nerve centers.

The two conditions supplement each other as follows (1) Collapse of the lungs decreases oxygen saturation of blood, the volume of which has been decreased by hemorrhage, and so contributes to failure of oxygenation of the vital centers (2) Pressure in the pleural cavity obstructs the return of venous blood to the heart This hindrance is more effective and serious if the venous pressure is already lowered by a decrease in blood volume (3) Both the obstruction to venous return and decreased blood volume diminish the cardiac output (4) Exaggeration of the respiratory waves of blood pressure tends eventually to lower the mean blood pressure, and so augments a similar effect of decreased blood volume

From these considerations it is obvious that an individual can tolerate a higher intrapleural pressure if his blood volume has not been decreased by hemorrhage and that he can stand a greater decrease in blood volume if his respiratory and circulatory systems are not compromised by a high pressure in the pleural cavity The author therefore suggests the prompt use of blood transfusion, even using 1,000 cc of blood taken from the pleural cavity, and injecting into a vein of a patient with a traumatic hemopneumothorax There were no untoward complications

Treatment depends upon the severity of symptoms in each individual case The mild case needs nothing more than rest and mild sedation The severe case requires immediate treatment Rest, adequate sedation, oxygen and prompt blood transfusion are indicated It is believed by some that since transfusions raise the blood pressure, they prolong the bleeding, and it would therefore be wiser not to give them I certainly can see no reason why small transfusions should be withheld when these might be life saving Some believe that the blood should be aspirated and replaced by air Others are more conservative and leave the blood to act as a tampon The blood is eventually absorbed, even though very slowly It might be drawn off after the bleeding has apparently stopped for several days, and replaced by air Decompression thoracentesis should be used very cautiously, and only when cardiac and respiratory distress is extreme My case was treated conservatively and made an uneventful recovery Two small late aspirations of

bloody fluid were made in the hope of speeding up the lung reexpansion Air should always be used to replace the aspirated fluid Once the lung has reexpanded, pleural symphysis occurs There is no record of a recurrence of spontaneous hemopneumothorax

#### Case Report\*

J G, age 24, male, white, single, clerk Familial history negative Always underweight Height 71½ inches Weight 118 lbs First visit to family physician in September, 1938, for slight cough Examination and fluoroscopy negative Basal metabolism minus 18 Cough mild, but returned at irregular intervals until present pulmonary accident On the evening of Nov 24, 1939, after returning from a leisurely walk of several miles, was suddenly seized with pain in the left chest, became dyspneic and fainted Recovery was fairly prompt but dyspnea returned severely the following morning His family physician then visited him and found a left pneumothorax with fluid A portable x-ray revealed a complete left pneumothorax with fluid up to the 4th rib Mediastinum and contents were displaced to the right I was called to see the patient on the evening of Nov 25, 1939 Physical examination revealed a pale, thin individual presenting moderate dyspnea His left hemithorax was ballooned and immobile Percussion note was hyper resonant in the upper half and flat in the lower half Breath sounds were absent There was faint whispered pectoriloquy heard above the fluid level Trachea and heart were found displaced to the right On the right, percussion note was resonant and the breath sounds exaggerated and harsh A diagnostic tap produced blood The patient was treated symptomatically and made an uneventful recovery One hundred and fifty cc of dark blood was aspirated one month and two months later and replaced by air This blood also did not clot after standing in a beaker for three days Blood count on Dec 2, 1939, showed 60 per cent (Dare) hemoglobin, R B C 3,300,000, W B C 13,650 Differential was normal Achromia and anisocytosis were present Poikilocytosis was very slight No nucleated cells were present The

\* I am indebted to Dr Benjamin Feldstein, of New York City, the patient's physician, for his kind cooperation in presenting this case

blood picture later returned to normal. Animal inoculation of pleural blood and concentrated sputa examinations revealed no tubercle bacilli. Wasserman was negative. Temperature went up to 100° and lasted only 2 to 3 days. X-ray on Feb 26, 1941, revealed a completely re-expanded lung with thickened pleura at the extreme apex and base. No pulmonary pathology was visible. To date the patient has been symptom free. He has gained over 30 pounds and is working regularly in his normal occupation.

### Summary

- 1) Idiopathic Spontaneous Hemopneumothorax is uncommon
- 2) The etiology is still controversial
- 3) Symptoms may appear insidiously or severely
- 4) The effect of physical exertion is questionable
- 5) Onset may suggest abdominal or coronary pathology
- 6) Concomitant pleural effusion is present
- 7) Anticoagulants are present in the effusion
- 8) Treatment consists of rest, adequate sedation, oxygen, blood transfusion, and aspiration of blood with replacement by air

1750 Grand Concourse

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### Additional Report

Since presenting the above case, I have had the opportunity of seeing another case of spontaneous hemopneumothorax. H. S., slender white male, aged 39. This patient was under the care of Dr. George Bellos, of New York City, for a severe neglected case of diabetes. With the aid of large doses

of insulin, the patient's condition finally improved. Soon afterwards, he again began to lose weight and his physician found an early pneumonic process in the left hilus. There were no symptoms referable to pulmonary pathology. Sputum was negative but smears of gastric contents were full of tubercle bacilli.

I saw the patient first on Oct. 31, 1941, and instituted pneumothorax on the left side in an attempt to control the pathology. The lung collapsed easily and no adhesions were apparent. Subsequently, a considerable pneumothorax space was obtained. About three and a half weeks after the initial pneumo-

thorax, and four days after his last refill, the patient found himself becoming moderately dyspneic. Temperature soon ranged between 101 and 102½ degrees. Fluoroscopy revealed an increase of approximately two interspaces in the small amount of fluid already present. A diagnostic tap produced hemorrhagic fluid which did not clot. The hemopneumothorax in this case was not due to external trauma but was on a tuberculous basis. Since the general condition of the patient was fair, treatment consisted of bed rest, sedation, and fluid aspiration with replacement by air.

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## The Problem of Pulmonary Tuberculosis in the Navy

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The problem of pulmonary tuberculosis in the Navy today consists of far more than merely diagnosing and treating this disease in Naval personnel. Certain environmental conditions exist aboard ship which are peculiar to the Navy alone and which play a part in contributing toward the incidence of pulmonary tuberculosis in naval personnel. Medical officers are constantly studying with a view to discovering methods of eliminating these hazards. The ultimate disposition of all cases of pulmonary tuberculosis requiring further treatment and follow-up is another matter for consideration. Close cooperation exists between the Navy, American Red Cross, local health departments and the Veterans Administration in the disposition, treatment and follow-up of all naval personnel discharged from the service with pulmonary tuberculosis. The problem of dependents of naval personnel who have contracted this disease is still another one which the Navy handles through its outpatient department. Chest films, sputum examinations, and other laboratory tests on dependents are part of this service. Report of these cases to local health departments, follow-up and treatment are all included in this service. Another important ramification of the prob-

lem of pulmonary tuberculosis lies in the study and application of those methods which will result as far as possible in the elimination of endemic pulmonary tuberculosis. Accurate statistical data must be kept and studied from year to year in order to analyze the results achieved from changes in methods and policies.

The various ramifications of the problem of pulmonary tuberculosis in the Navy have been briefly indicated in order to emphasize the extent of this problem. A more detailed discussion of its various phases follows below.

The arduous nature of duty in the naval service under peace time conditions as compared to the work the individual may have been engaged in prior to his enlistment often-times may tax his resistance to the utmost. Naval duty afloat subjects a man to call twenty-four hours a day. As emergencies arise he may be called upon to put forth a maximum effort, for an extended period of time, under the most difficult working conditions. Once again before he has had sufficient rest, situations may arise which necessitate his presence at his battle station. Irregular habits of eating and sleeping are inevitable under such strenuous activity. Even

at best, compared to civilian standards, living conditions are somewhat crowded. In ships of the destroyer type and smaller, the same compartments are often used for eating, sleeping and recreation. Such environmental conditions predispose toward the development and spread of diseases of the respiratory tract. It makes the early detection of acute diseases of the respiratory tract and pulmonary tuberculosis imperative. A single case of active pulmonary tuberculosis expectorating positive sputum under such circumstances would, if undetected, probably result in further cases. Facilities for recreation and relaxation are too often limited in frequency and extent. The problem of maintaining physiological resistance under ordinary working conditions is therefore a far more difficult one among naval personnel. Lack of adequate physical and mental rest thus intensifies the problem of maintaining physiological resistance aboard ship. Various physical factors also play a part in diminishing the individual's resistance, some of which may have both a direct and indirect part in laying the ground work which precedes the development of pulmonary tuberculosis. Extremes of temperature and climate are commonplace in naval duty. This may vary from Arctic areas with prolonged periods of exposure to the elements and sub-zero temperatures, to duty in tropical zones. The incidence of tuberculosis in the white race is greater and the spread much more rapid in tropical and sub-tropical climates. Here again the early detection and isolation of all such cases is of great importance. Naval personnel may be exposed to altitudes

of 30,000 feet above sea level in connection with flight duty, other duty may include descents to 400 feet below sea level while working with diving units. Arduous though these various types of duty may be, such conditions are all accentuated under war time conditions. The summation of all these factors plays a role in the diminished individual resistance to *Mycobacterium Tuberculosis Hominis*.

The mission of the Medical Corps of the Navy is to keep as many men at as many guns as many days as possible. The number of sick days and loss to the service resulting from hospitalization due to pulmonary tuberculosis seriously interfere with this mission. Prior to detection and hospitalization numerous sick days and decreased efficiency of the ship's organization may result. This is especially applicable to men in key positions. It is a function of the Bureau of Medicine and Surgery to keep and analyze all statistical data pertaining to pulmonary tuberculosis as well as other diseases. The admission rate per 100,000 for all forms of tuberculosis is in all instances based on the average naval strength for the current calendar year. Statistics on tuberculosis for the years 1934-1938 are presented below. Tuberculosis is treated as a separate class in the United States Navy Nomenclature of Diseases and Injuries.

The admission rate of all forms of tuberculosis was 163 per 100,000 as compared with 182 in 1933 and 176, the median rate for the preceding 5 years. There were 39,783 sick days reported for tuberculosis (all forms). The non-effective ratio per 100,000 or the

TUBERCULOSIS (All Forms) 1934

DISEASE	Admissions	Admission rate per 100 000	% of class Admissions	Sick days per case	% of class sick days
Tuberculosis, pulmonary, chronic, active	146	133.48	82.02	134.2	83.00
Tuberculosis, unclassified	20	18.28	11.24	104.1	10.20
Tuberculosis, pulmonary, chronic, arrested	6	5.49	3.37	97.0	5.12
Tuberculosis, pulmonary, acute, pneumonic	4	3.66	2.25	87.4	1.54
Tuberculosis, pulmonary, acute general miliary	1	.91	.56	45.0	.11
Tuberculosis, general miliary	1	.91	.56	9.0	.02
TOTAL FOR ENTIRE CLASS	178	162.73	100.00	126.3	100.00



daily average number of patients under treatment, was 100 as compared with 103, the median for the preceding 5 years

The admission rate for all forms of tuberculosis was 131 per 100,000 as compared with 163 in 1934 and 170, the median rate for the preceding 5 years

A total of 32,150 sick days was recorded for tuberculosis (all forms), or a daily average of 77 per 100,000 patients constantly on the sick list. The median non-effective ratio for the preceding 5 years was 100

The admission rate for all forms of tuberculosis was 136 per 100,000 as compared with 131 in 1935 and 170, the preceding 5 year median. Tuberculosis (all forms) was responsible for 34,536 sick days, or a daily average of 76 per 100,000 patients constantly on the sick list. The median non-effective ratio for the preceding 5 years was 94

The admission rate for all forms of tuberculosis was 114 per 100,000 as compared with 136 in 1936 and 170, the preceding 9

year median. A total of 37,894 sick days was recorded for tuberculosis (all forms), or a daily average of 78 per 100,000 patients on the sick list. The median non-effective ratio for the preceding 9 years is 95

The admission rate for all forms of tuberculosis was 87 per 100,000 as compared with 114 in 1937 and 170, the preceding 9 years median. Tuberculosis (all forms) was responsible for 33,182 sick days, or a daily average of 65 per 100,000 patients on the sick list. The median non-effective ratio for the preceding 9 years is 94

An analysis of these statistics will reveal that the admission rate for tuberculosis has dropped from 163 per 1,000 in 1934 to 87 per 1,000 in 1938. The non-effective ratio (number of sick days per year x 1,000)

(average strength x 365 (or 366)

for this same period dropped from 100 per 1,000 in 1934 to 94 per 1,000 in 1938

At this writing the last statistics include

## TUBERCULOSIS (All Forms) 1935

DISEASE	Admissions	Admission rate per 100 000	% of class Admissions	Sick days per case	% of class sick days
<i>Tuberculosis, pulmonary, chronic, active</i>	121	105.97	80.67	131.8	88.58
<i>Tuberculosis, unclassified</i>	16	14.01	10.67	61.4	5.92
<i>Tuberculosis, pulmonary, chronic, arrested</i>	6	5.25	4.00	70.4	3.50
<i>Tuberculosis, pulmonary, acute, pneumonic</i>	5	4.38	3.33	71.6	1.56
<i>Tuberculosis, pulmonary, acute general miliary</i>	2	1.75	1.33	50.0	.31
<i>Tuberculosis, Skin</i>	0	0	0	42.0	.13
TOTAL FOR ENTIRE CLASS	150	131.36	100.00	117.8	100.00

## TUBERCULOSIS (All Forms) 1936

DISEASE	Admissions	Admission rate per 100 000	% of class Admissions	Sick days per case	% of class sick days
<i>Tuberculosis, pulmonary, chronic, active</i>	144	115.75	85.21	141.7	88.61
<i>Tuberculosis, unclassified</i>	11	8.84	6.51	91.9	5.32
<i>Tuberculosis, pulmonary, chronic, arrested</i>	5	4.02	2.96	86.9	3.52
<i>Tuberculosis, pulmonary, acute, pneumonic</i>	4	3.22	2.37	80.0	1.62
<i>Tuberculosis, pulmonary, acute general miliary</i>	3	2.41	1.77	58.7	.51
<i>Tuberculosis, general miliary</i>	2	1.61	1.18	45.6	.40
TOTAL FOR ENTIRE CLASS	189	135.85	100.00	131.3	100.00

the calendar year 1939. For 1939, with an average strength of 149,618, the admission rate was 1.00 per 1,000 with a non-effective ratio of 0.65 per 1,000. These figures indicate that definite progress is being made in the decline in the incidence of tuberculosis in the Navy. With the methods now in effect, and which are being instituted, this decline should continue.

The diagnosis of pulmonary tuberculosis in the Navy is the responsibility of the medical officer. He must be constantly on the watch for this condition. As already mentioned, the rather crowded living conditions aboard ship make the early diagnosis and isolation of all cases imperative. With the exception of destroyers, most of the larger units of the fleet are equipped with facilities for taking chest films. All have laboratory facilities for sputum examinations and blood counts. Once the diagnosis has been established, the transfer of the patient to the nearest Naval Hospital is made with the least possible delay. This is especially true in the tropics where delay in transfer to the States may result in rapid spread of the dis-

ease. Once the diagnosis has been made and the transfer to the nearest naval hospital accomplished, the responsibility of the medical officer does not cease. Henceforth, he must be more alert than ever for the possible development of further cases. At the earliest opportunity he arranges for a chest survey on the entire ship's crew. This is usually done by means of roentgen photography using 35 mm film. In addition, he has to arrange for a follow-up on the dependents of the case in question. Chest films and other diagnostic tests are arranged at the nearest outpatient department.

By no means least important is the role the medical officer plays in the education of the ship's personnel to the dangers of pulmonary tuberculosis. In talks to the ship's company he must discuss some of the more important symptoms and signs of this disease. He must also stress the importance of reporting to the sick bay immediately upon the development of symptoms referable to the respiratory tract.

The treatment of pulmonary tuberculosis in Navy personnel is confined almost entirely

#### TUBERCULOSIS (All Forms) 1937

DISEASE	Admissions	Admission rate per 100 000	% of class Admissions	Sick days per case	% of class sick days
<i>Tuberculosis, pulmonary, chronic, active</i>	123	92.58	80.92	145.5	86.00
<i>Tuberculosis, unclassified</i>	18	13.55	11.84	129.3	9.56
<i>Tuberculosis, pulmonary, chronic, arrested</i>	5	3.76	3.29	75.4	2.19
<i>Tuberculosis, pulmonary, acute, pneumonic</i>	4	3.01	2.63	11.3	1.76
<i>Tuberculosis, pulmonary, acute general miliary</i>	2	1.41	1.32	93.5	.49
TOTAL FOR ENTIRE CLASS	152	114.41	100.00	139.8	100.00

#### TUBERCULOSIS (All Forms) 1938

DISEASE	Admissions	Admission rate per 100 000	% of class Admissions	Sick days per case	% of class sick days
<i>Tuberculosis, pulmonary, chronic, active</i>	108	77.58	89.26	151.4	88.02
<i>Tuberculosis, unclassified</i>	5	3.59	4.13	121.0	5.47
<i>Tuberculosis, pulmonary, chronic, arrested</i>	4	2.87	3.31	102.6	4.64
<i>Tuberculosis, pulmonary, acute pneumonic</i>	4	2.87	3.31	107.8	1.62
<i>Tuberculosis, pulmonary, acute general miliary</i>	0	0	0	38.0	.23
TOTAL FOR ENTIRE CLASS	121	86.92	100.00	144.3	100.00

to Naval Hospitals. The only exception to this rule is in the case of officers, midshipmen, nurses and enlisted men with long periods of service. These persons are transferred to the Army's Fitzsimmons General Hospital at Denver, Colorado, for treatment.

The period of hospitalization in naval hospitals is comparatively short, namely, six months. At the end of this period patients are transferred to the United States Veterans Administration for further treatment. Despite this relatively short period of treatment, collapse measures are instituted with the least possible delay. Treatment is carried out by medical officers who have received special training in the collapse therapy of pulmonary tuberculosis. Upon transfer of the patient to a Veterans Administration Facility, usually all that is required is continuation of the treatment already instituted in the Naval Hospital. Upon admission of all cases of pulmonary tuberculosis the local health departments are notified for the purpose of statistical record and for further check-up. Upon release or transfer of patients the local health department is also notified.

While a patient is under treatment in a Naval Hospital, as a public health measure open cases with positive sputum are not allowed liberty to go ashore where they might disseminate the disease.

The American Red Cross, through its social workers attached to Naval Hospitals, assists the patient in effecting his transfer to a Veterans Administration Facility usually near his home. It is the fixed policy of the Bureau of Medicine and Surgery, once a diagnosis of pulmonary tuberculosis has been established, to retire that individual permanently from the United States Naval Service regardless of the extent or degree of the lesion.

Through the medium of the Red Cross social workers who contact the family of the tuberculous patient, provision is made for the diagnosis of any further cases in the patient's immediate family. This work is usually carried out by the outpatient department. Should hospitalization of dependents be required, the Red Cross assists in finding low cost hospitalization and in some instances renders financial assistance. Following release from an institution these individuals may then re-

ceive pneumothorax refills and other treatment at the outpatient department. Here again close cooperation exists between the local health departments to which all cases are reported as a public health measure.

By far the greatest problem, however, lies in the elimination of endemic pulmonary tuberculosis among Naval personnel. Some of the methods for accomplishing this end have already been indicated. Already one important step has been made in this direction by the routine roentgen photography of all recruits entering the Naval Service. The following radiological findings are considered disqualifying:

- 1) Any evidence of reinfection (adult) type tuberculosis, active or inactive, exclusive of slight thickening of the apical pleura
- 2) Evidence of active primary (childhood) type tuberculosis
- 3) Inactive primary tuberculosis if the degree or extent of involvement appears to be of present or future clinical significance
- 4) Evidence of fibrinous or serofibrinous pleuritis

Another method of control not yet in general usage, but which will be used more and more in the future, lies in conducting chest surveys by means of roentgen photography in all Naval units ashore and afloat in which one or more cases of active pulmonary tuberculosis has been detected. In addition to these measures research is constantly being made on methods of improving ventilation and sanitation aboard ship. Air conditioning has, in some instances, been tried. The part of the medical officer in conducting this research and suggesting new methods of control is invaluable. The Bureau of Medicine and Surgery welcomes suggestions from all personnel along this line which contribute to this end. Accurate statistics and their analysis in the future will determine if the methods for the control of pulmonary tuberculosis in the Navy are yielding results.

*U S Naval Hospital*

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## Organization News

DR CHEVALIER L JACKSON GUEST SPEAKER FOR CUBAN CHAPTER



Reading from left  
to right

Senator Dr Octavio Rivero, Governor, Dr Antonio Navarrete, Regent Dr Chevalier L Jackson Guest Speaker, Dr Luis Ortego, President, Dr Gustavo Aldereguia, President, Cuban Chapter

Dr Chevalier L Jackson, Philadelphia, Pennsylvania, a Fellow of the American College of Chest Physicians, was the guest speaker at the meeting of the Cuban Chapter of the College which was held at the Medical School of the University of Havana, Tuesday, April 14. In addition to Dr Jackson's talk, the following program was presented and all of the papers were delivered in Spanish supplemented by lantern slides and films.

Dr Luis Ortega, *presiding*

1) Introductory Speech, Dr Gustavo Aldereguia, President of the Cuban Chapter of the College

2) X-Ray Study of the Internal Relief of the Respiratory Organs, Dr Pedro L Farinas, demonstrating a new mucosographic technic evolved by the author

3) The Bronchoscope and Its Role in Modern Medicine, Dr Chevalier L Jackson

4) Cases illustrating different aspects of tracheobronchial diseases, Drs A Antonetti, J Gros, F J Menendez, P Hernandez, J G Arrazuria, R G Mendoza, R Meneses, A Navarrete

5) Closing Remarks, Dr Antonio Navarrete, Regent of the American College of Chest Physicians

### OHIO CHAPTER HOLDS ANNUAL MEETING

The Ohio Chapter of the American College of Chest Physicians held its annual meeting at the Neil House, Columbus, Wednesday, April 29. This meeting was held in conjunction with the annual meeting of the Ohio State Medical Association. Dr William F Hulse, Cleveland, spoke on "The Otolaryngological Aspects of Tuberculosis."

The following officers were elected: Dr David W Heusinkveld, Cincinnati, President; Dr Norbert S Greene, Brecksville, Vice-President; Dr Joseph B Stocklen, Cleveland, Secretary-treasurer (re-elected); Dr Louis Mark, Columbus, is the retiring President.

### NEW JERSEY CHAPTER HOLDS ANNUAL MEETING

The New Jersey Chapter of the College held its annual meeting at Haddon Hall, Atlantic City, Wednesday, April 22. The meeting was held in conjunction with the annual meeting of the New Jersey State Medical Society. The meeting was called to order by Dr Joseph R Morrow, Ridgewood, President of the Chapter, and Dr Paul K Bornstein of Belmar was appointed Secretary *pro tem* in the absence of Dr Charles I Silk, Secretary-Treasurer of the Chapter.

Dr Julian Johnston, Director, Department of Thoracic Surgery, University of Pennsylvania Hospital, Philadelphia, gave an inter-

esting talk on "Total Pneumonectomy," illustrated with pictures. A brief outline of his talk is presented

- A Indications for total pneumonectomy
  - 1) Carcinoma
  - 2) Bronchiectasis
  - 3) Multiple Abscesses
  - 4) Tuberculosis
  - 5) Benign Adenoma, not cured by bronchoscopy
    - (a) Carcinoma
      - Diagnosis must be early
      - Bronchoscopy
      - Aspiration biopsy
      - Exploratory incision
    - (b) Bronchiectasis
      - Pneumogram must be done with visualization of all five lobes
    - (c) Multiple Abscesses
      - Refractive to drainage as an indication
    - (d) Tuberculosis
      - Still in the stage of evolution
- B Preoperative Care
  - 1) Bronchoscopic drainage with aspiration is essential in bronchiectasis
  - 2) In his twenty case reports he does not use a preoperative pneumothorax
- C Surgery
  - 1) Anesthesia
  - 2) CO washed out so that patient took no voluntary respirations
  - 3) No rib resections are done
  - 4) Negative pressure pneumothorax instituted
  - 5) In any previous infected case, a thoracoplasty to obliterate the emphysema cavity
  - 6) To prevent postoperative pain, crushing of intercostal nerves two to seven

The discussion was opened by Dr M James Fine of Newark

The Nominating Committee consisting of Drs Samuel B English, Glen Gardner, and Martin H Collier of Grenloch, presented the following names for officers

Dr Joseph R Morrow,\* Ridgewood, President, Dr Clyde M Fish,\* Pleasantville, Vice-President, and Dr Paul K Bornstein, Belmar, Secretary. These officers were unanimously elected

An expression of thanks was given to Dr Charles I Silk, the retiring Secretary-Treasurer

The Chapter voted to hold quarterly scientific sessions at various points throughout the state. The first of these sessions will be held at the Bergen Pines Sanatorium. It will be a luncheon meeting and a guest speaker will be invited. Members of the Chapter will also be invited to present papers of scientific interest

The Reception Committee for the National

Convention of the American College of Chest Physicians requested the cooperation of all the members of the Chapter and their presence at Atlantic City, June 6-8

\*Re-elected

#### PENNSYLVANIA CHAPTER TO HOLD MEETING AT ATLANTIC CITY

The Pennsylvania Chapter of the College will hold a short business meeting following the dinner of the American College of Chest Physicians, Monday night, June 8, at the Dennis Hotel, Atlantic City. This meeting will be addressed by one of the officers of the College

The President and Secretary of the Pennsylvania Chapter have asked all members of the Chapter to make plans immediately for accommodations in Atlantic City. Advance information suggests the possibility of a large attendance and in order to forestall any disappointments, this matter should be attended to immediately. The officers of the Pennsylvania Chapter will be looking forward to seeing you in Atlantic City

#### NEW YORK CHAPTER MEETINGS

A symposium on diseases of the chest was arranged and sponsored by the New York State Chapter of the College and presented as a part of the scientific program of the New York State Medical Society meeting at the Waldorf-Astoria, New York City, April 30. This session was one of the best attended of the whole convention. Speakers were introduced by Dr Martin Marino, the presiding chairman of the General Sessions. A resolution was introduced by Dr Melson Strohm, President of the New York Chapter, to hold a similar symposium at the coming meeting of the State Medical Society in Buffalo. This resolution was unanimously passed by the delegates of the New York State Medical Society

The annual election of officers for the New York State Chapter will be held at the Hotel Dennis, Atlantic City, on the evening of June 8, following the annual dinner and smoker of the College. It is hoped that every member of the New York State Chapter will attend the national meeting

## Book Reviews

**THE AUTONOMIC NERVOUS SYSTEM** Anatomy, Physiology, and Surgical Treatment, by James C White, M.D., Assistant Professor and Tutor in Surgery, Harvard Medical School, and Reginald H Smithwick, M.D., Instructor in Surgery, Harvard Medical School. Second edition 470 pages, 92 illustrations Price \$6 75 The Macmillan Company, New York, 1941

This monograph which first appeared in 1935 has been extensively enlarged and revised. Those familiar with the first edition will find much new material in the second edition. The experience of many individuals during the past six years in the surgery of the sympathetic system has been digested and many procedures which were still in the experimental stage when the first book was written have been critically evaluated in the present edition.

An interesting chapter on the historical development of our knowledge of the visceral nervous system has been included. The anatomy, physiology, and pharmacology of the autonomic system are each given rather extensive treatment in separate chapters. These do not serve as an adequate review of all experimental work bearing on this subject. The material will probably be sufficient for the practitioner and surgeon and serves its purpose as an introduction to the clinical parts of the text. Considerable more attention has been given to the physiology and treatment of visceral pain than the title might indicate. A detailed discussion of methods of study in this field is included.

Part II of the book deals with the individual conditions in which ablations of the sympathetic system has been suggested. These include the effect on peripheral vascular disease, on bones and joints, and on a variety of conditions involving the head and neck, the heart and aorta, the lungs, the gastro-intestinal system, and the genito-urinary system are discussed in separate chapters. An excellent chapter on the treatment of hypertension by sympathetic surgery is included. Developments in this field which have been particularly rapid during the past six years are discussed in detail and extensive bibliography is included.

The short chapter on the lung discusses the early favorable reports of German, French, and Russian workers of sympathectomy on bronchial asthma. Recent work with

larger postoperative periods of observation do not support this early enthusiasm. The authors state that "sympathectomy cannot be recommended for this condition." On the other hand total resection of the pulmonary vagal branches has more valid physiological backing. They believe that a wider clinical trial to this operation is indicated. They recommend "that as a preliminary to operation the effect on vital capacity of a deep bilateral paravertebral injection with procaine should be determined."

Part III is concerned with surgical technique. The illustrations, none of which are half-tones, are inferior to many available in the literature. This section will, however, serve as a starting point for further reading in this phase of the subject.

The book is a well organized and relatively complete monograph of this rapidly growing subject. There is much to commend it to the student of neurology, and the practitioner who is interested in the neurophysiological approach to problems of disordered visceral function and intractable pain. It will serve even the most advanced student and experimental worker as a source of much information and its many references of great help for further study.

Robert S Dow

**THE BLOOD BANK AND THE TECHNIQUE AND THERAPEUTICS OF TRANSFUSIONS** By Robert A. Kilduffe and Michael DeBakey. Pp 558, with 214 illustrations and one color plate. The C V Mosby Company, St. Louis, 1942

As the names of the authors and the chapter headings listed below would suggest, this book covers the ground indicated by its title thoroughly and should be of value to anyone interested in the indications for blood transfusions, the techniques of typing, matching, obtaining and storing blood or plasma, and in the methods of transportation and administration of blood or plasma transfusions.

The titles of the chapters in the order of appearance are History, Rationale, Indications, and Contraindications, The Military Aspects of Transfusion, Special Types of Transfusion, Technique of Blood Typing and Compatibility Tests, Anomalous Blood Typ-

ing Reactions Their Nature, Causes, and Detection, and Methods for Their Elimination, The "Universal Donor" and the "Universal Recipient", The Blood Bank, The Changes Which Occur in Stored Blood, The Biochemical Changes in Stored Blood, The Operation of a Blood Bank, Plasma Transfusion, The Preparation and Preservation of Citrated Plasma, The Preparation of Concentrated and Dried Plasma, Methods and Technique of Transfusion, Complications of Blood Transfusion

At the end of each chapter is an extensive and well-chosen list of references. It does not discuss, as do some books on the same subject, the heredity of blood groups, the medicolegal aspects of blood groupings, or the anthropologic distribution of blood groups. A considerable number of different methods are described for each procedure, so that anyone using the book will find a choice from which he may select his method. It might be desirable, in subsequent editions, to have a critical discussion of the advantages and disadvantages of each procedure included to aid the physician in making his selection. Special attention is given to the military problems that may arise in the use of blood plasma and blood transfusions. The book is up to date, as is shown by the data on the Rh factor in blood transfusion reactions and erythroblastosis fetalis and of a description of the intramedullary transfusion technic. The style, on the whole, is clear, but the authors show a fondness for big words where simpler words would be equally effective. e.g., ineluctable, exegetically, and on page 67, the use of the French "dernier resort" instead of "last resort". There are a few errors which are unavoidable in a first edition and will doubtless be corrected in subsequent editions. Perhaps the most unfortunate of these is in the table on page 263, which is to illustrate the correct method of labeling of stored blood. After a discussion of the importance of the care and accuracy with which this should be done they record the blood group in the table as "B (II Moss)", when, of course, it should be "B (III Moss)".

On the whole, every laboratory doing much blood grouping, everyone responsible for the operation of a blood bank or of a plasma collection service, and every physician giving transfusions in civil or military practice

will find the book of value

Edwin E Osgood, M D

**THORACIC SURGERY** by Charles W Lester A.B., M.D., F.A.C.S. Oxford Medical Outline Series, Oxford University Press, 1941 Price \$2.00

This is a very timely book of particular value to general surgeons, medical students and all physicians, as it presents, in outline form, the essentials of the anatomy and physiology of the thorax and its contents.

Anesthesia is discussed, as well as diseases of the chest wall, mediastinum, esophagus, pericardium, heart, pleura and lungs, with considerable space devoted to the surgical treatment of pulmonary tuberculosis.

The technique of oleothorax is not approved. I would suggest consulting an article on the same subject by the late Dr Ray W Matson, which appears in Goldberg's "Clinical Tuberculosis".

Tuberculous pleurisy is given as a contraindication for closed intrapleural pneumonolysis. If it is non-febrile, it is not a contraindication—neither is obliterative pleuritis, if contracting operable adhesions are responsible for premature lung expansion.

Another indication for the operation, not mentioned, is pressure phenomena, such as mediastinal displacement, downward pressure on liver or stomach (phrenic dyspepsia),—the result of high pressures necessary to maintain a satisfactory collapse of the lung in the presence of adhesions. The book is recommended.

R C M

#### NEWS NOTE

A meeting will be held of the members of the College from the state of Maryland and the District of Columbia for the purpose of organizing a District Chapter of the College. This meeting has been scheduled for the Hotel Dennis, Atlantic City, New Jersey, Monday, June 8, at 9 00 P. M., in connection with the annual meeting of the College.

Dr Wm D Tewksbury, Governor of the College for the District of Columbia, will preside and Dr John H Peck, Oakdale, Iowa, Past President of the College, will address the meeting. All members of the College from the state of Maryland and the District of Columbia are urged to attend this meeting which will follow the annual Smoker of the College.



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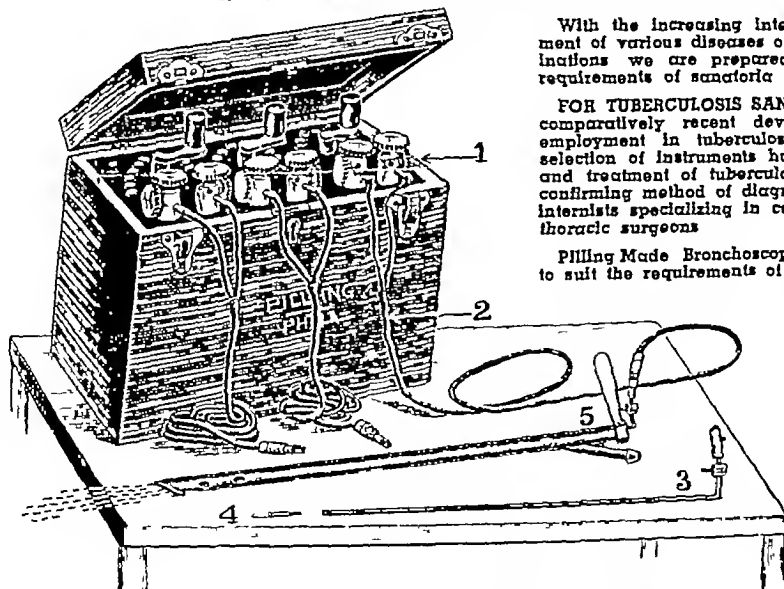
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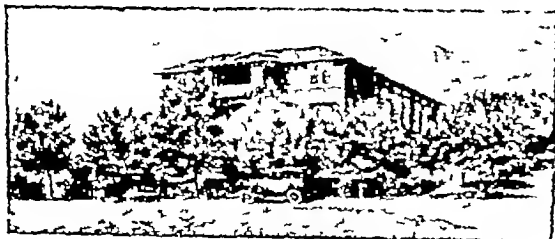
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## CONTENTS:

EXTRAPULMONARY NON-TUBERCULOUS  
DISEASE COMPLICATING PULMONARY  
TUBERCULOSIS (Page 102)

Eugene Rosenman M D Duarte California

PULMONARY ACTINOMYCOSIS (Page 107)

Charles J Koerth M D J M Donaldson, Jr, M D  
and C C Pinson M D San Antonio Texas

AMBULATORY BILATERAL  
PNEUMOTHORAX (Page 111)

Oren A Beatty, M D Glasgow Kentucky

ALLERGIC COUGH (Page 115)

Samuel J Prigal M D New York, New York

THE ROAD TO EARLY DIAGNOSIS (Page 120)

J R Patton, M D, Ogdensburg New York

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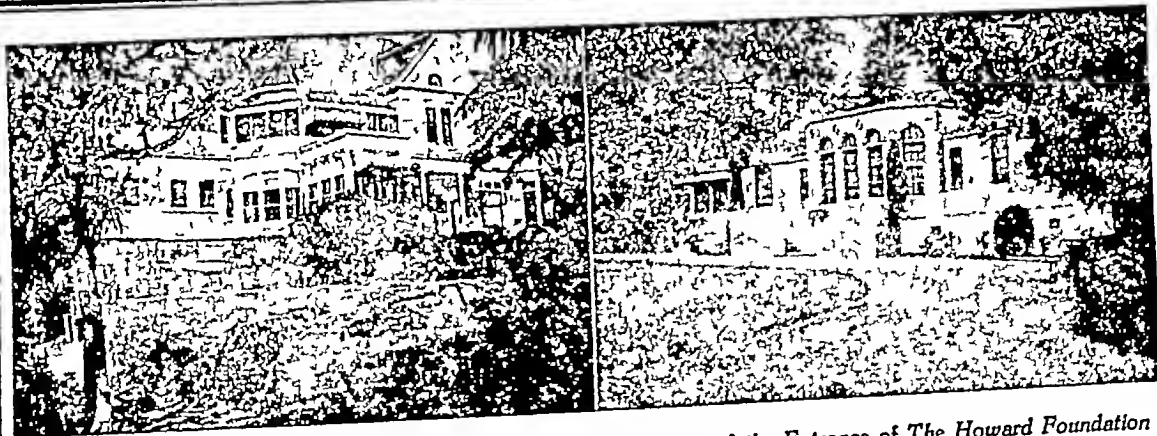
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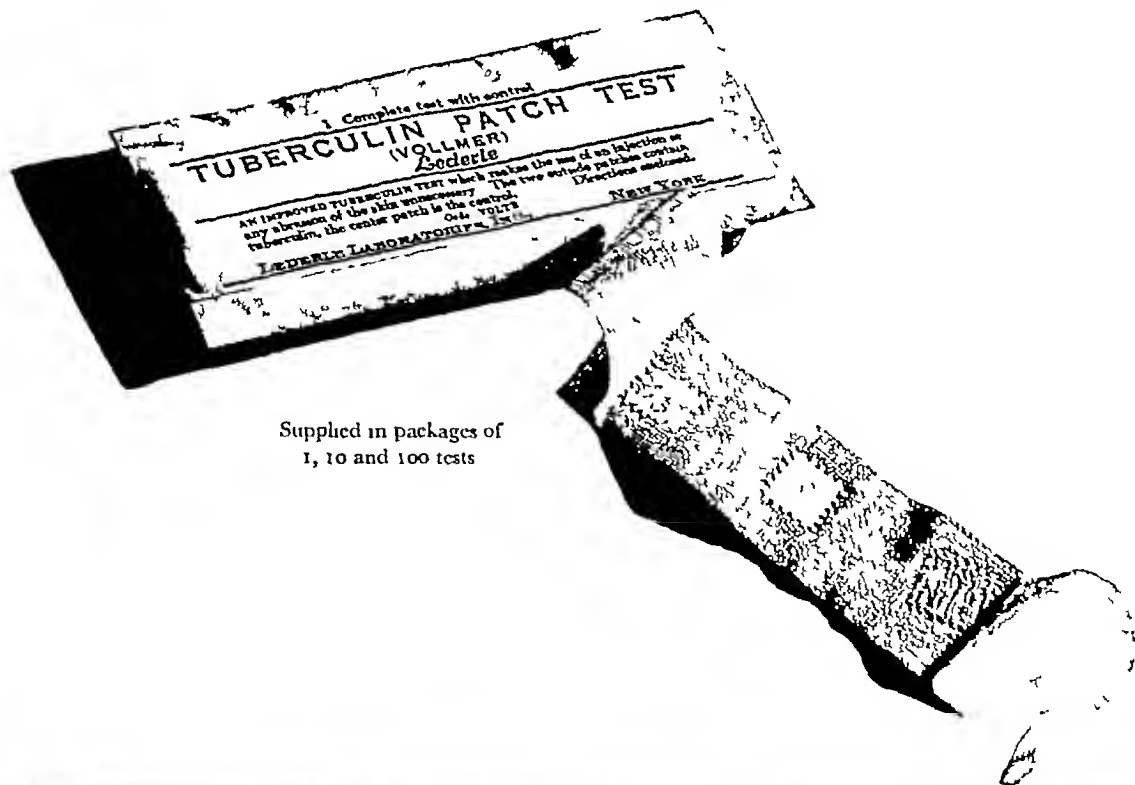
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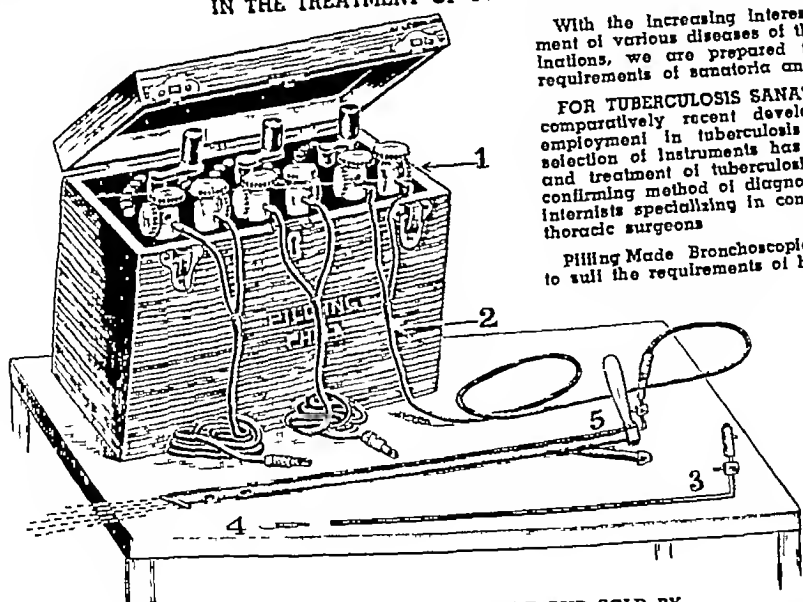
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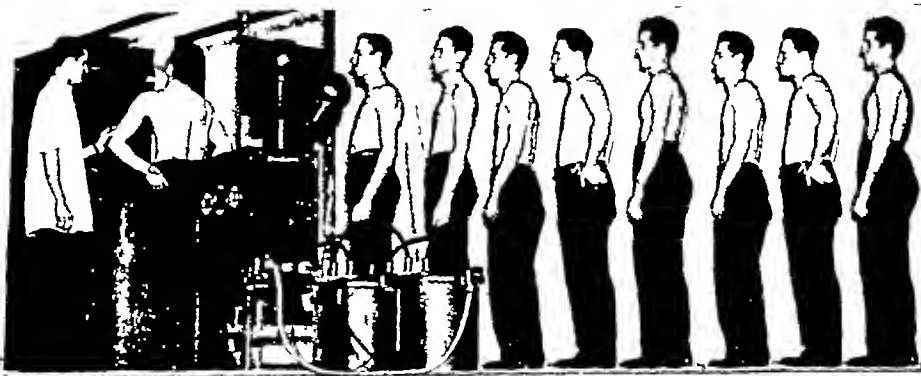
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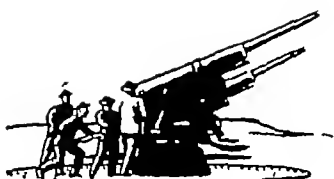
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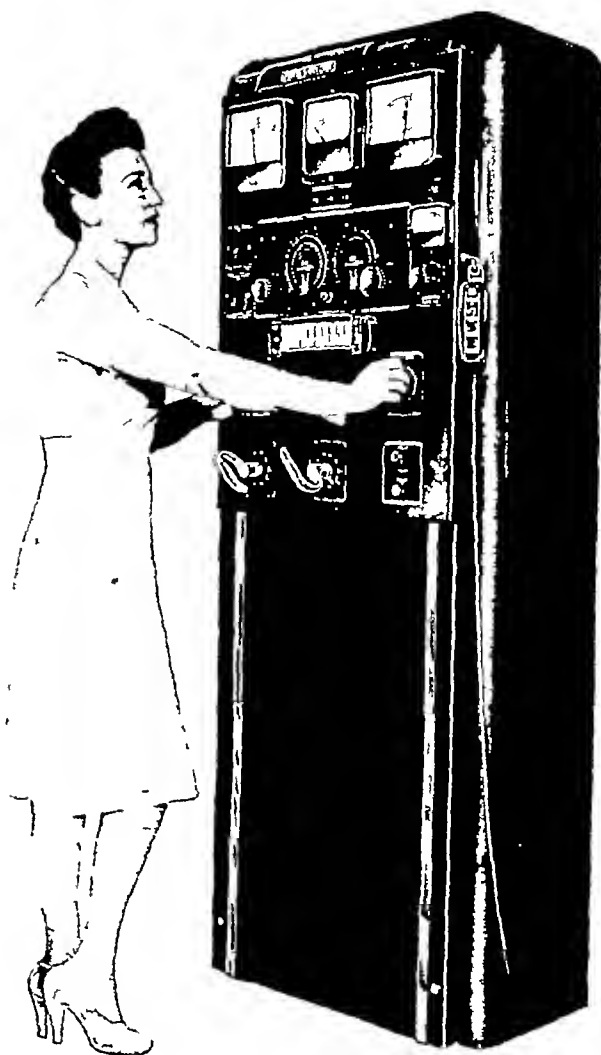


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February 23, 1942

Mr Murray Kornfeld  
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Sincerely yours,

R. G. Leland, M. D.  
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RGL EH

# Extrapulmonary Non-Tuberculous Disease Complicating Pulmonary Tuberculosis

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Duarte, California

That non-tuberculous extrapulmonary disease can occur in a patient having pulmonary tuberculosis is self-evident. Yet, it appears that this possibility is quite often ignored in the differential diagnosis of extrapulmonary complications of pulmonary tuberculosis. The mere fact that a patient has pulmonary tuberculosis seems to be a sufficient excuse to label any extrapulmonary complication as tuberculous. Too often hasty erroneous diagnoses of intestinal tuberculosis or tuberculous laryngitis are made merely because the patient happens to suffer also from pulmonary tuberculosis. It is not intended here to minimize the importance of considering extrapulmonary tuberculous complication in the differential diagnosis of such cases. The writer merely wishes to stress the importance of considering also the possibility of non-tuberculous disease occurring in such patients. This possibility should be kept in mind even in cases of moderately or far-advanced pulmonary tuberculosis in which tuberculous extrapulmonary complications are more likely to occur. In minimal pulmonary tuberculosis, and especially in arrested cases, such secondary extrapulmonary tuberculous complications are very rare indeed, and in such cases non-tuberculous disease should be ruled out first in the differential diagnosis. Three such cases simulating tuberculous enteritis are presented here as a demonstration of the pitfalls in diagnosis one may encounter if this fact is not kept in mind.

*Case 1*—K R, female, age 40. Admitted to the Los Angeles Sanatorium, Sept 25, 1935, complaining of diarrhea, vomiting and loss of 35 pounds weight over a period of two years. Prior to admission, she was studied in another hospital where a roentgenogram of the chest revealed a "healed tuberculous lesion in the left upper lobe," and an exploratory laparotomy revealed, according to the surgeon's report, "tubercular enteritis involving especially the lower ileum." On ad-

mission, patient appeared markedly emaciated (weight was 89 pounds). Physical examination revealed nothing remarkable. Roentgenogram of the chest revealed several small nodules in the third anterior interspace in the left side, apparently healed tuberculosis. No sputum was available, since patient did not cough or expectorate. Examination of feces for tubercle bacilli was negative. Gastric analysis revealed total and free acid within normal limits. Hemogram was normal, except for a mild microcytic anemia and an erythrocyte sedimentation rate of 41 mm in one hour. Series roentgenograms with barium progress meal revealed a spasm of the terminal ileum. A clinical diagnosis of non-specific ileitis was made, and an exploratory laparotomy was performed. This revealed a thickening of the terminal ileum over a distance of two feet, and a proximal dilatation of the small bowel indicating a partial obstruction. No nodules were found on the peritoneal surfaces. The terminal ileum was resected and microscopic examination revealed subacute regional ileitis of unknown non-specific origin. No evidence of tuberculosis was found. Patient made an uneventful recovery. When last seen in 1939, she was well and working.

*Comment*—The roentgenologic picture in this case was suggestive of intestinal tuberculosis, viz, a defect in filling of the terminal ileum with retardation of passage of the barium meal proximal to the lesion. This picture and the gross pathologic findings on laparotomy, as reported by the surgeon, could have led us to acquiesce in the original diagnosis of intestinal tuberculosis, were it not for the fact that the pulmonary lesion was minimal and apparently healed. The similarity in the roentgenologic appearance of intestinal tuberculosis and non-specific ileitis of Crohn is well known. Weber<sup>1</sup> has pointed out the difficulty in differentiating between these diseases roentgenologically. After discussing some fine technical points as guides in the differential diagnosis, he finally resorts to the importance of ascertaining the

\* Los Angeles Sanatorium

presence or absence of active pulmonary tuberculosis as an important aid. Even the gross pathologic appearance of these two lesions is indistinguishable. Only the microscopic picture can be of help in ascertaining definitely which of these two conditions one is dealing with, and even this fails at times, as was noted by Schapiro<sup>2</sup>. It appears, therefore, that clinically, before laparotomy is done, the presence or absence of active pulmonary tuberculosis is the most important aid in the differential diagnosis between intestinal tuberculosis and non-specific ileitis of Crohn.

*Case 2*—J. S., male, age 44. Transferred to Los Angeles Sanatorium March 30, 1935, from another hospital with a diagnosis of tuberculosis of the cecum. He had been complaining of severe generalized cramp-like abdominal pains, unrelated to time or kind of food intake, since March 1934. Pain was associated with anorexia, loss of twenty pounds of weight in six months, and chills and fever of 102 degrees F. On admission, patient was

acutely ill and appeared cachectic. His weight was one hundred pounds. The abdomen was distended but soft, and no masses were palpable. There were no other abnormal findings on physical examination. Chest roentgenogram revealed several calcified nodules in the apices of both lungs. Hemogram showed hemoglobin 56 per cent, erythrocytes three million, leukocytes and differential were normal, erythrocyte sedimentation rate was 19 mm in one hour. Sputum was negative for tubercle bacilli and occult blood. Widal reaction was negative. Series roentgenograms of the gastrointestinal tract with a barium meal revealed evidence of some obstruction in the cecal region. After a short stormy course of chills and fever of 102 degrees F, rapid loss of weight and recurring attacks of diarrhea, patient expired April 24, 1935. Post mortem examination revealed healed tuberculosis of the apex of the right lung, primary scirrhous carcinoma simplex of the head of the pancreas with metastases into the retroperitoneal lymph glands and the



Figure I

*Case 1*—Note few discrete healed nodules in the 3rd anterior interspace



Figure II

*Case 2*—Film taken 6 hours after ingestion of barium. Note the filling defect of the terminal ileum—string sign of Crohn.

spleen, and few annular ulcerations in the lower duodenum and upper jejunum, probably from tumor infarction. No lesions were noted in the colon, cecum or lower ileum.

*Comment*—The presence of calcified nodules in the apices of the lungs as demonstrated on the roentgen film apparently prejudiced the mind of the physician to make the erroneous diagnosis of tuberculosis of the cecum. Certainly, the mere finding of obstruction in the cecum is insufficient evidence for such diagnosis. A filling defect in the cecum may be encountered in any ulcerative lesion and is a common sign in carcinoma of the cecum. In this particular case carcinoma of the cecum could have been considered a more likely possibility and a more nearly correct diagnosis, since the patient did have a malignancy in the abdomen. The true localization of the malignancy in this case was difficult indeed, since the patient had no jaundice and no pain or tenderness in the upper abdominal quadrant.

*Case 3*—S R, age 53. Has had pulmonary

tuberculosis since 1929. He was a patient in the Los Angeles Sanatorium during the year of 1930. At that time a fibrocaseous involvement of the major portion of the right lung was found. Sputum was positive for tubercle bacilli. After the induction of therapeutic pneumothorax there was a marked improvement in the roentgenologic appearance of the chest and a conversion of the sputum. Patient was discharged as an arrested case, and in 1932 after the pneumothorax was discontinued on the outside, there was at re-examination evidence of a marked fibrosis of the major portion of the right lung. There were no changes noted on a recheck film taken in 1934. During all these years and until 1940 patient was well and active. During 1940 he noticed a gradual loss of weight which became more rapid in the last two months prior to his readmission to the Los Angeles Sanatorium. During those two months, he noticed also some increase in cough and a slight dyspnea on exertion. But his chief complaint was a severe diarrhea.



*Figure III*

*Case 2*—Note few calcified nodules in apices of both lungs, especially the right apex.



*Figure IV*

*Case 2*—Film taken 6 hours after ingestion of barium meal. Note filling defect in cecum and ascending colon.



of twelve bowel movements daily associated with mild abdominal postprandial cramps and a tenesmus. He also noticed blood in his stools on a few occasions. His examining physician recommended sanatorium care and he was, therefore, admitted to this institution November 18, 1940. On admission, he was found to be undernourished, but not acutely ill. His weight was 122 pounds. Roentgenogram of the chest revealed no change from his previous films, i.e., there was marked fibrosis throughout the right lung. Activity of the lesion was questionable. Sputum was negative for tubercle bacilli. Other laboratory findings of note were hemoglobin 70 per cent, erythrocytes 4,250,000, leukocytes and differential within normal limits. Examination of stool for occult blood was positive. Series roentgenograms of the gastrointestinal tract with a barium meal did not reveal anything remarkable. A sigmoidoscopic examination revealed a growth in the rectum about 7 inches from the anus. Biopsy was performed and a grade II adenocarcinoma was found on microscopic examination.



Figure V

Case 3—Note marked fibrosis throughout right lung. Activity cannot be determined from film.

*Comment*—In this case a consideration of intestinal tuberculosis was more justifiable in view of the fact that the patient's pulmonary lesion was far advanced. However, according to the findings of Erickson,<sup>3</sup> intestinal tuberculosis is uncommon after 4 years of pulmonary tuberculosis, 90 per cent of the cases of intestinal tuberculosis developing within 4 years of pulmonary tuberculosis. These findings, coupled with the fact that this patient's sputum has been negative for tubercle bacilli over a period of eight years, should have made one keep the diagnosis of intestinal tuberculosis in abeyance and look for some other more likely cause for the patient's symptoms.

*Discussion*—Extrapulmonary tuberculosis not secondary to a pulmonary focus of infection is very rare, the only exception being bone and joint tuberculosis which often may be unassociated with any pulmonary focus, especially in case of the bovine bacillus infection. All other extrapulmonary tuberculous infections are usually secondary to a focus in the lungs which may be latent or active. This pulmonary focus may be either the primary phase ("childhood type" or primary complex of Ranke) or the secondary reinfection phase ("adult type"). In case of the former, the implantation into the extrapulmonary organs has taken place during the early generalization phase of Ranke, in the case of the latter, during the later generalization phase, or by direct contact with the infected sputum. In the former case, the primary focus may be healed, while the extrapulmonary disease may become active and present the only manifestation of clinical tuberculosis in the body. This does occur in some cases of genito-urinary tuberculosis, also in some of the human bacillus type of bone tuberculosis. The great majority of the other extrapulmonary tuberculous infections, however, as well as a large percentage of genito-urinary and bone tuberculosis, are associated with an active pulmonary lesion of the secondary phase, the implantation of the tuberculosis having taken place either by direct contact with infected sputum or by the hematogenous or lymphogenous route. Those taking place by the hematogenous route are usually associated with a generalized activity and spread of the tuberculosis, and do not present any diagnostic

difficulties. It is the more insidious infections occurring by the direct contact with the infected sputum, e g, tuberculous laryngitis, tuberculous enteritis, tuberculous peritonitis (the latter is usually secondary to intestinal tuberculosis), that often present difficult problems in diagnosis. Of these, the most common and most difficult problem is presented by intestinal tuberculosis for several reasons: first, there are a great many diseases both inside and outside of the abdominal cavity that may give rise to intestinal symptoms, second, intestinal symptoms are quite common in patients with pulmonary tuberculosis, these symptoms being of a toxic or a neurogenic origin, third, intestinal tuberculosis is the most common extrapulmonary tuberculous complication. It is, therefore, only natural that the physician should first think of intestinal tuberculosis whenever a patient with pulmonary tuberculosis begins complaining of intestinal symptoms. However, there are certain facts related to the pathogenesis and etiology of intestinal tuberculosis (as well as of many other extrapulmonary tuberculous complications), which could be of great aid in their differential diagnosis. It is a well established fact that chronic ulcerative intestinal tuberculosis is caused by direct infection of the intestinal mucosa by tubercle bacilli contained in the ingested sputum. Whatever the predisposing factor for the pathogenesis of intestinal tuberculosis may be, whether it be a preexisting inflammatory change in the intestinal wall, or a deficiency of certain vitamins in the diet, or trophic disturbances,<sup>4</sup> or certain allergic or anergic states, there must be a direct infection of the intestinal mucosa with sputum containing tubercle bacilli. It is still a debatable question whether it is the number of tubercle bacilli present on the sputum, or their prolonged contact with the intestinal mucosa that is the important factor in the infection. No one will dispute, however, that tubercle bacilli must be present in the sputum to cause the infection. This brings us to another important fact in the pathogenesis of intestinal tuberculosis, viz, there must be a degenerating ulcerative pulmonary lesion present, in other words, active pulmonary tuberculosis must be present. The patient with a healed inactive pulmonary lesion is very unlikely to develop tubercu-

lous enteritis. As a matter of fact, even patients with active pulmonary tuberculosis, but in the minimal stage, very rarely develop tuberculous enteritis. In 575 cases of secondary ulcerative intestinal tuberculosis reported by Lawrason Brown,<sup>5</sup> only 9 occurred in patients in the minimal stage. In the same group studied, 291 occurred among patients in the moderately advanced stage and 275 among those in a far-advanced stage.

Since the clinical symptomatology of intestinal tuberculosis simulates many non-tuberculous diseases of the intestines, and since the roentgenologic picture presents no pathognomonic findings, the presence or absence of active pulmonary tuberculosis often remains the most important aid in the differential diagnosis of such cases. At least, we are justified in assuming that the complicating disease is not tuberculous, if the patient has an inactive, healed pulmonary lesion, or even if the lesion happens to be active but in the minimal stage. This fact is often true in the case of other extrapulmonary complications. With the exception of the very rare cases of primary extrapulmonary tuberculosis, and with the exception of the few cases in which implantation has taken place during the primary phase of pulmonary tuberculosis and in which the primary focus may have become healed, the great majority of extrapulmonary tuberculous infections are secondary to active pulmonary tuberculosis. Whether the implantation into the other organs has taken place through the hematogenous route or by direct contact, the primary focus in the lungs must be active and usually moderately or far advanced. The converse is, therefore, also true, namely if a patient having inactive healed pulmonary tuberculosis develops an extrapulmonary complication, this complication is most likely of non-tuberculous origin.

*Summary*—Three cases of extrapulmonary non-tuberculous disease simulating intestinal tuberculosis and occurring in patients with pulmonary tuberculosis are presented. The infrequency of extrapulmonary tuberculosis in cases of minimal pulmonary tuberculosis especially with inactive healed lesions is stressed, and the importance of considering the likelihood of non-tuberculous disease in such cases is emphasized.

*Los Angeles Sanatorium*

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## Pulmonary Actinomycosis

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Actinomycotic infection in man is comparatively rare Lord<sup>1</sup> was able to find only 65 cases in 122,408 admissions to the Massachusetts General Hospital while Sanford and Voelker,<sup>2</sup> in 1925, were able to collect statistics on 670 cases in the United States. In 12,000 consecutive autopsies<sup>3</sup> at Johns Hopkins Hospital, only eight of the deaths were found to be due to actinomycosis and of these only one was considered to be a primary pulmonary infection.<sup>4</sup> Of all cases of actinomycosis, 14 per cent are of the thoracic type. The most common site of actinomycotic infection is the cervico-facial region in which 60 per cent of all cases occur. The majority of cases of actinomycosis reported have been in males.

### Case Report

P K, age 31, a housewife, was admitted to the Robert B Green Memorial Hospital on May 2, 1940, with the chief complaints of productive cough, and draining sinuses in the left chest, posteriorly. She injured her chest in an automobile accident in November of 1939. The site of the injury became swollen and painful, and a lesion resembling a carbuncle developed. This lesion ruptured in February, 1940. Purulent material began to drain from the resulting opening and air was drawn into and expelled from this orifice with each act of respiration. The patient had lost much weight. She had had pertussis when three years old and epileptic attacks all of her life. Her blood Wasserman had been positive since 1930. The family history was irrelevant.

The physical examination upon entrance

revealed an emaciated white female who appeared chronically ill. The heart rate and rhythm were normal. The thoracic muscles were wasted but equal expansion was observed on both sides. Dullness was present over the left chest, posteriorly, with rales in the base. A broncho-pleuro-cutaneous fistula presented several openings in the left chest wall, posteriorly. The abdomen and extremities were negative. The temperature was 98.6°.

Many pus cells and rare erythrocytes were present in the urine. The erythrocyte count was 3,200,000, the leucocyte count was 44,-

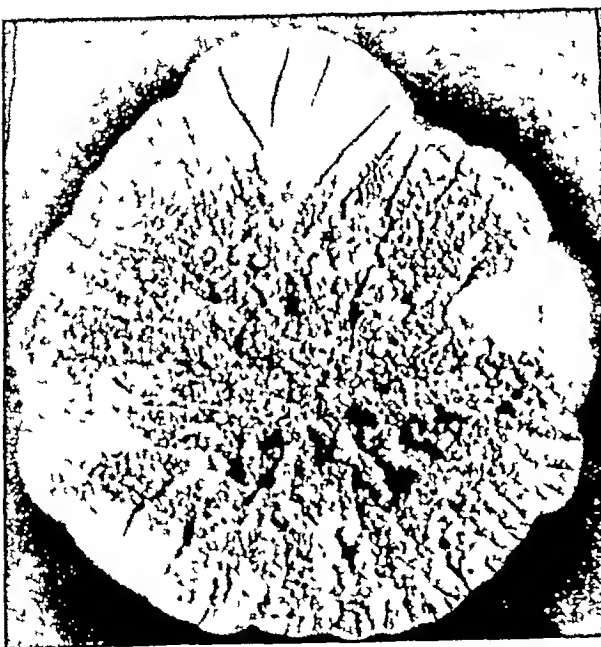


Fig 1 Numerous "sulphur granules" were found upon microscopic examination of sputum

\* From the Woodmen of the World War Memorial Hospital



*Fig 2a Slide cultures of the organism produced a thickly matted mass of acid-fast mycelia*



*Fig 2b A giant colony grown on Krainsky's medium was irregular in outline and had a convoluted surface. The organism was a pinkish white in color and produced a dark red pigment which diffused throughout the medium.*

700, hemoglobin 51 per cent, polymorphonuclears, 93 per cent, lymphocytes, 4 per cent, monocytes, 1 per cent, eosinophils, 0 per cent. The Kahn was three plus, and the sputum was negative for tubercle bacilli, both upon direct examination and culture. "Sulphur granules" were found in the sputum upon examination of a "wet preparation" (Fig 1), and culture of the sputum produced a growth of acid-fast actinomyces (Figs 2a and 2b).

X-ray examination (Fig 3) revealed a moderate infiltration throughout the right lung, especially marked in the middle and lower lobes. An area of increased density was seen extending along the periphery of the left lung from the first interspace to the dome of the diaphragm.

On May 22, 1940, left thoracentesis resulted in the removal of 450 cc of fluid, the first portion of which was yellow in color while that removed at the end of the aspiration was tinged with blood. This exudate was negative for tubercle bacilli. Subcutaneous emphysema developed over the left chest and the upper portion of the abdomen on May



*Fig 3 X-ray examination revealed a moderate infiltration throughout the entire right lung. An area of increased density was present along the periphery of the left lung from the first interspace to the dome of the diaphragm.*

25, presumably from the puncture made when the chest was aspirated. On May 30, 1940, under local anesthetic, a portion of the skin edge of one of the draining sinuses was removed for tissue study. The pathological report given by Dr. W. V. Knoll was as follows: "A ragged piece of tissue measuring 1.5 cm by 1 cm by 2 mm presented one epithelial surface while the opposite surface consisted of a firm rubbery grayish yellow structure. A microscopic section stained with hematoxylin and eosin showed marked infiltration of inflammatory exudate with many neutrophils. One giant cell was present but no fungus mycelia were found."

The patient ran a septic temperature ranging from 98° to 102.2° F, reaching 103.6° a day before her death which occurred on June 4, 1940. A request for an autopsy was refused.

The actinomyces was cultured on various media with the following characteristics noted: On carrot infusion agar, colonies round, yellowish white, adherent to the substrate; Sabouraud's and Krainsky's agar, colonies round with irregular edges ranging in color from yellow and pink to lavender with a dark brown pigment diffusing throughout the medium; on broth, surface growth with fine sediment. Milk coagulated. Gelatin liquified. No gas production was noted in sugar broth cultures but acid was produced in dextrose broth.

Pulmonary actinomycosis may closely simulate pulmonary tuberculosis in its clinical manifestations. The onset of the disease is gradual, with weakness, loss of strength and weight, and with the later appearance of productive cough. The sputum is usually mucopurulent and contains the "sulphur granules" characteristic of the infection. Intermitting fever, night-sweats, chills, hemoptysis, pain in the chest, emaciation, and anemia may be present. With progression of the pathological process, involvement of the chest wall occurs with the formation of an abscess in an intercostal space. This abscess will eventually rupture and form a draining sinus. Physical examination reveals no signs characteristic of this disease. Signs of infiltration are usually observed over the bases of the lungs, a fact which is an aid in distinguishing pulmonary tuberculosis from pulmonary actinomycosis. However, if the in-

volvement is not confined to the lower lobes of the lungs its similarity to tuberculosis is increased. Collections of pus may occur in the pleural cavity<sup>15</sup> but usually the pleurae are sealed together by the inflammation thus obliterating the pleural space. Involvement of the ribs and sternum often occurs. In the absence of erosion of the ribs there is no roentgen sign upon which to base a diagnosis of actinomycosis.

The early lesions of pulmonary actinomycosis consist of a central area composed of polymorphonuclear cells and filaments of the ray fungus. Surrounding this area is a ring of necrotic cells and cellular debris, while encircling this zone is another composed of typical granulation tissue. Giant cells and endothelial cells may be present. This disease spreads by means of the direct continuity of tissues and, unlike tuberculosis, ignores anatomical boundaries.<sup>6</sup>

Four types of pulmonary actinomycosis have been described.<sup>5</sup> In the bronchitic type the infiltration is confined to the bronchi and is characterized by the presence of pus and fungi in the bronchi. This type of lesion is probably the first stage of each infection produced by inhalation of the organism. The pneumonic type presents a picture resembling an ordinary bronchopneumonia in which the process spreads from the bronchi into the adjacent alveoli which are filled with pus. As the lesion progresses, the alveoli first affected show an attempt at healing by the replacement of the inflammatory exudate with connective tissue, producing a fibrous nodule. In other areas there is no production of fibrous tissue but the alveolar walls are eroded and small abscesses are formed. Coalescence of these abscesses produce the large pulmonary cavities usually seen when the patient comes to post mortem. In the pleuropneumonic form, the abscesses are large<sup>11</sup> and the infection has involved the pleurae. The inflammation usually produces a pleuritis which obliterates the pleural space. In some instances collections of pus may obtain in the pleural cavity. The pus often penetrates the chest wall and produces a sinus in an intercostal space, or a rib may become involved.<sup>9,10</sup> Perforation of the diaphragm may also occur.<sup>15,16</sup> As is readily seen, these three types are but successive stages of the same process. The fourth type

is a metastatic process. Isolated nodules are present throughout the lung parenchyma. It is questioned whether this type really represents a blood stream dissemination<sup>14</sup> for these nodules are rarely found in the liver or kidneys as would be expected in a metastatic process. It is possible that these are in reality due to a bronchogenic spread even though their relation to the bronchi cannot be demonstrated.

An absolute diagnosis cannot be made without isolating and culturing the organism or by finding the characteristic "sulphur granules" in the sputum. Culturing of the organism is beset with difficulties for, due to the slow growth of the actinomyces, it is often overgrown by organisms which are secondary invaders. The granules are not formed in rapidly progressing cases but only when there is a prolific production of connective tissue and their presence in the pus has been construed to be significant of considerable tissue resistance to the invading organism. The "sulphur granules" may be sterile in cases of long standing and thus thwart an attempt to culture the organism.

Although long considered to be pathognomonic of actinomycosis, the "sulphur granule" has been found in pus from conditions entirely unrelated to actinomycosis. Inspissated particles of pus may resemble the granule upon gross inspection but microscopic examination will reveal its true nature.

There is no characteristic blood picture, however, there always occurs an elevation of the leukocyte count. No specific agglutinins have been demonstrated in the blood serum of the patient.

Potassium iodide<sup>8, 17, 18</sup> orally, in increasing doses to the point of tolerance, has been used in the treatment of pulmonary actinomycosis. Lipiodol intratracheally and intramuscularly<sup>13</sup> have been used. The roentgen ray has produced favorable results in the hands of some investigators. Among other things used in the treatment of this disease are the internal administration of arsenic, copper sulphate, and oil of eucalyptus. Specific vaccines have been employed with indifferent results. Surgical<sup>12</sup> removal of the involved tissue has been productive of good results in many forms of actinomycosis but has not yielded striking results when employed in the pulmonary type. As evidenced

by the multiplicity of the types of therapy suggested, there is no single satisfactory one.

### Summary

1) A case of pulmonary actinomycosis was presented in which the characteristic "sulphur granules" were present in the sputum and from which an aerobic acid-fast actinomycetes was isolated.

2) A brief discussion of the incidence of pulmonary actinomycosis, its symptomatology, physical signs, roentgen picture, pathology, diagnosis, and treatment was offered for consideration.

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## Ambulatory Bilateral Pneumothorax

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The purpose in making this report is two-fold (1) to show that bilateral pneumothorax is a practical and life-saving procedure in ambulatory patients who cannot have sanatorium care, and (2) that it is a safe procedure when the technique employed is extraordinarily careful

Experience in treating tuberculosis in ambulant patients gives rise to the opinion that it can be treated successfully and adequately when and if it is discovered early. The early diagnosis of tuberculosis may eliminate the necessity of so many sanatorium beds, provided there is the proper set-up and a qualified personnel for treating the ambulant patient after the diagnosis is made. Unquestionably, there is a dire need for sanatorium beds in many states and it will be many years before this need is supplied, but with a set-up that has been described in a previous paper<sup>1</sup> ambulatory treatment may play a great role in controlling tuberculosis until a hospital bed is available to every patient. A large group of these unfortunate patients may have recourse to pneumothorax which, of all the surgical procedures used in the treatment of tuberculosis, adapts itself more favorably to ambulatory treatment than all the others. Pneumothorax should be utilized to the fullest extent where indicated and bilateral pneumothorax is a safe procedure in ambulatory patients

### *Technique of Administration*

The success of ambulatory bilateral pneumothorax depends on the technique of administration. It has been said that the complications and accidents of bilateral pneumothorax are more than twice those of unilateral pneumothorax. What probably is true

is that most of the complications and accidents of unilateral pneumothorax are subclinical and may go unnoticed on account of the other uncollapsed lung, whereas, in bilateral pneumothorax the same complications and accidents develop with marked symptoms because of the lowered vital capacity due to both lungs being collapsed

The usual choice of site is an interspace just below the inferior angle of the scapula. The skin and subcutaneous tissues are anesthetized with 1 per cent novocain down to the parietal pleura. The course of the anesthetizing needle goes by the upper border of the rib and to the parietal pleura which may be infiltrated without puncturing it. For the initial treatment an ordinary twenty gauge needle is used. It is inserted slowly, firmly and directly with full control of its motion and without deflecting its course. During the insertion of the pneumothorax needle the eye is kept on the manometer constantly because it is the most accurate indicator of the location of the point of the needle. As soon as the least perceptible motion of the water column is detected, the course of the needle is arrested. If the pressure is negative and the oscillations free, the needle is held stationary and 50 cc of air is allowed to flow into the pleural cavity, but if the oscillations are not free, the needle is gently pushed the smallest distance further and if still they are not free, the needle is removed and cleaned of water droplets, blood or pieces of tissue. The process is then repeated and usually 250 or 300 cc of air is given during the first treatment. In describing the technique of the initial insufflation, Packard, Hayes and Blanchet<sup>2</sup> recommended the use of a blunt tipped needle. When they thought the point of the needle was in the pleural space, the passageway between \*

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needle and the manometer was opened to watch for fluctuations. This passageway should be kept open from the beginning because the manometer is as important in the first insufflation, to tell you the location of the point of the needle, as at any subsequent time. This is particularly true in bilateral pneumothorax. Alexander<sup>3</sup> described the use of a blunt tipped needle in the initial insufflation but the connection between the manometer and the pleural cavity is kept open so that it may be observed when the needle enters the pleural cavity. He advised guarding against the danger of the sudden plunge of a dull needle.

Full control of a blunt tipped needle is almost impossible and there is danger of puncturing the lung. It tears through tissues and on account of the pressure needed to push through the tougher layers of tissue, it will often suddenly push into others before its course can be arrested. Packard, Hayes and Blanchet<sup>2</sup> described the "snapp" felt and oftentimes heard in using the blunt needle. Too much trauma is caused when there is this much resistance, whereas, with the sharp pointed needle there is very little difference in resistance of tissues and the course of the needle can be arrested at any point. On account of the negative intrapleural pressure found in a free pleural space, it is not necessary that all of the lumen at the bevel of the needle be in the intra-pleural space in order to get oscillations. When only a small part of the lumen is in the intra-pleural space there is not enough of the sharp point of the needle to lacerate the visceral pleura. In case the pleura is adherent, producing less oscillations, puncture of the lung in this case could not be serious. The negative intrapleural pressure found in a free pleural space keeps the passageway open at the lumen even if all of it is not in the pleural cavity because the change in negativity is only relative. If the pressure were positive, then there might be a flap valve-like effect.

When refills on the two sides come simultaneously, they are given at the same time. No particular effort is made to have the refills for each side come on different days unless there is some unusual reason, but rather an effort is made to give both refills on the same day when they fall close

together, because this saves the patient extra effort and expense if he has to come a long distance. When both treatments are given simultaneously, it should be considered which side to give first. If quite a reserve of vital capacity is present it does not matter which side is refilled first. If the vital capacity is low and one lung is completely collapsed and this collapse has to be maintained, then it is better to refill the completely collapsed side first. The other side may then be pushed down short of the point of dyspnea if necessary. The same technique as in the initial insufflation should be observed in subsequent refills.

#### *Indications for Bilateral Pneumothorax*

The chief indication for this form of treatment is bilateral disease that is progressive in spite of bed rest. It is more successful in the early cases before adhesions have formed. It may be tried in the far-advanced bilateral cases, but in these adhesions are often encountered. In the far-advanced cases one lung may be completely involved and require a complete collapse. Unless the disease is located favorably for selective collapse in the other lung, an attempt to collapse the lung sufficiently may lower the vital capacity to the point of severe dyspnea. Also, when one lung requires a complete collapse and a cavity is centrally located among the larger bronchi in the other it is difficult to collapse to the point of cavity closure because of the "tent pole" effect of the bronchi. Adhesions that would not prevent closure of cavities in unilateral pneumothorax may do so in bilateral pneumothorax because pressure pneumothorax would produce its greatest collapse on the unadhered portion of the lung.

*The Best Results* may be obtained in the following types of cases

- 1) Bilateral progressive diseases in which the lesion occurs in the upper lobes and toward the apex of each lung

- 2) Bilateral progressive disease in which the lesion may be basal on one side and apical on the other, and

- 3) Bilateral progressive disease which is yet of only moderately advanced extent

*The Poorest Results* may be obtained in the following types of cases

- 1) Extensive disease in one lung requiring

complete collapse of the lung with a moderately advanced lesion in the upper lobe of the opposite side

2) Extensive disease in one lung requiring complete collapse with a root region lesion or cavity in the other lung

3) Extensive disease in one lung requiring complete collapse with moderately advanced lesion in the upper lobe of the opposite lung with adhesions

4) Adhesions in one or both sides preventing cavity closure in one or both lungs

5) Bilateral exudative tuberculosis

#### *Contraindications to Bilateral Pneumothorax*

There are no contraindications to bilateral pneumothorax more than the usual contraindications such as senility, asthma, heart disease, emphysema and extensive disease. It has been noted that the patients who require complete collapse of one lung due to extensive disease respond more slowly to bilateral collapse. A cavity that occurs near the root region of the good lung is difficult to close when the opposite lung has to be completely collapsed due to extensive disease. Refusal of the patient to completely stay in bed after the first few treatments is not necessarily a contraindication. In fact, it may be an indication, because this type of patient will be likely to have a progressive lesion.

#### *Complications and Accidents*

There were one complication and two accidents in these thirteen bilateral pneumothorax cases. The complication was a bronchopleural fistula with a tuberculous empyema in a patient who refused to stay in bed after the first few bilateral treatments. He did well for several months until he developed and died of a tuberculous empyema and pneumonia. The accidents were one spontaneous pneumothorax and one massive collapse. The spontaneous pneumothorax followed giving the initial bilateral treatment in the clinic and allowing the patient to return home without a period of bed rest. This lung was successfully reexpanded at home and the patient died over a year later of extension and progression of the disease. The massive collapse occurred in the right lung in a bilateral pneumothorax case on the operating table following a left phrenic

crushing. This phrenic crushing was done in order to close a cavity on the left that was strung up by an adhesion. When the massive collapse occurred, sufficient air was withdrawn from the left pleural cavity to relieve the severity of the dyspnea. Later the massive collapse cleared up but the cavity in the other lung has not closed and the patient is unimproved. The third fatal case was the only negro on which this treatment was tried. His disease seemed to progress more rapidly under bilateral pneumothorax. The other nine cases have improved to a marked extent under bilateral pneumothorax.

#### *Discussion*

This report is based upon thirteen cases of bilateral pneumothorax. This is not a large number of cases, but is a fair sized group of patients to be treated ambulatorily. Strictly speaking, these patients are not truly ambulatory but they stay in bed at home and return at stated intervals for refills. Most of them have stayed in bed well, but at least two have refused to stay in bed following discharge from the hospital and were truly ambulatory. Many of the others to my knowledge took unreported privileges.

Most of these cases have had unilateral pneumothorax for a few months or longer before the bilateral pneumothorax was initiated. In one patient there were only twelve days between the initial treatment of the two sides. The refills may fall on the same or different dates for the two sides. Only one patient was allowed to return home without hospitalization. All the others were hospitalized one to two weeks during initiation of the bilateral pneumothorax. Only one patient was kept in the hospital as long as three weeks and this was the patient who had collapse of both lungs initiated only twelve days apart. After leaving the hospital these patients returned to the clinic or to the office for refills.

It is difficult to compare the results in this group of bilateral pneumothorax cases with those of unilateral pneumothorax because this is a selected group of patients. It is a group in which unilateral pneumothorax was not sufficient and if bilateral pneumothorax had not been initiated, the results would have been 100 per cent unsuccessful, whereas in unilateral pneumothorax all types of cases

are represented. But in spite of this difficulty, a recent analysis<sup>1</sup> of cases, as previously reported, showed the mortality rate in the unilateral pneumothorax cases to be 32.5 per cent and in the bilateral cases 30 per cent.

Before leaving the discussion it might be well to mention the effect of bilateral pneumothorax on the heart. In fact, clinically no definite effect has been noted. The few times dyspnea has been produced has apparently been due to a decreased breathing space and not to any pressure effect upon the heart. With free pleural spaces bilaterally there is likely to be no clinical effect upon the heart, but it is conceivable that a combination of adhesions with high intrapleural pressures could produce an embarrassing effect upon the function of the right side of the heart.

The statistics of these cases, such as cavity closure, sputum conversion, etc., have not been reported in detail because that was not within the purpose of this paper and this is too small a series of cases for reporting such statistics, but the table represents some essential facts concerning these patients. It is not too small a group to demonstrate that bilateral pneumothorax is a safe and practi-

cal procedure in ambulatory cases in experienced hands and may prove another weapon in fighting tuberculosis in a large number of southern states where sanatorium beds are not available for all tuberculous patients.

### Conclusion

In conclusion, three of thirteen bilateral pneumothorax cases are dead and one is unimproved. All the others are improved or better. The remarkable thing is that all thirteen of these patients would be either dead or terminal cases had it not been for bilateral pneumothorax, which was carried on ambulatorily without sanatorium beds available. Bilateral pneumothorax is a safe and practical procedure in the ambulatory treatment of tuberculosis in trained hands.

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NAME	Age at time of bilateral pneumothorax	Time of collapse of first lung	Time of collapse of second lung	Pneumothorax discontinued	Condition at present	Color	Complication	Accident
E D	19	Rt 8-13-37	Lt 11-22-23	9-4-39	9-8-39 Dead	W	Broncho Pleural Fistula	
V A	18	Rt 8-17-35	Lt 12-28-36	Lt 12-28-39	Improved	W		
M R	23	Lt 11-19-36	Rt 6-21-38	Discontinued 6-21-38	12-8-39 Dead	W		Spon Pneumo
A S	48	Rt 1-18-37	Lt 5-23-39	Lt 5-7-40	Arrested	W		
B A	38	Rt 7-15-37	Lt 4-23-40		Improved	W		
T R	28	Lt 4-12-40	Rt 8-2-40		Improved	W		
W T	23	Lt 9-15-39	Lt 12-2-39		Improved	W		Massive Collapse
A R	24	Rt 6-9-37	Lt 1-10-39	Rt 11-8-38 Lt 2-27-40	Unimproved	W		
L C	39	Rt 5-23-38	Lt 9-5-39		Improved	W		
L B	17	Approx Oct '37—Rt	12-37—Lt	Took last treatment 11-12-40	Pregnant Improved	W		
O G	23	Rt 10-13-36	Lt 3-30-37	Both sides 9-7-37	6-28-39 Dead	B		
A D	31	Lt 11-2-36	Rt 6-11-39	Both sides 9-16-39	Arrested	W		
L M C	22	Lt 9-7-40	Rt 9-19-40		Improved	W		

TABLE Essential Facts Concerning Bilateral Pneumothorax Cases

## Allergic Cough

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The respiratory tract is the principal allergic shock organ. Such diseases as seasonal hay fever, perennial hay fever (allergic or vasomotor rhinitis), and asthma have long been recognized and treated on an allergic basis. Polyposis of the nasal mucous membrane<sup>1</sup> is considered to be an allergic phenomenon. Recently, evidence has been presented to prove that bronchiectasis<sup>2</sup> is a late manifestation of a fairly common and unrecognized condition—allergic bronchitis.<sup>3</sup> It is the purpose of this contribution to describe another condition, allergic in nature, involving the respiratory tract, namely, allergic cough.

This is usually a loud barking cough of such intensity and force (like the sneezing in hay fever) that it draws the attention of all within hearing radius. It is paroxysmal in nature, relatively nonproductive, may last from a few minutes to hours or days, and defies analysis by the usual method of examination. Radiographic examination of the chest and examination of the sputum are negative. Physical examination of the chest is entirely negative. The patient does not look or feel sick, the usual complaint is of an itchy, scratchy or rubbing sensation deep in the throat, and this irritation reflexly leads to coughing spells.

Although allergic cough resembles the cough of the asthmatic in many respects, the two can be differentiated readily. In the former the chest examination is negative. In the latter, sibilant and sonorous rales and prolonged expiration are found. Again, the asthmatic is dyspnoeic and usually complains of pressure over the sternum. In allergic cough there is no obstruction to respiration and none of the other complaints.

The allergic nature of this cough is characterized by certain phenomena common to all allergic diseases.<sup>4</sup> There is (1) the marked familial history of allergy as well as (2) history of past and/or concomitant allergic conditions such as urticaria, eczema, gastrointestinal allergy, migraine, etc. (3) Sensitivity to allergens are readily demonstrable by skin testing. (4) There is therapeutic re-

sponse to epinephrin and related drugs. (5) The illness is periodic. Contact with the allergens produces the cough, removal leads to periods of freedom. (6) The sensitivity can be reduced by immunization with the allergen concerned, particularly if it is an inhalant.

Like the other allergic diseases of the respiratory tract, particularly hay fever and asthma, the cases of allergic cough may be grouped into two categories—Seasonal and Perennial. Some cases fall into both, as in hay fever and asthma. The seasonal cases coincide with the pollens. Positive but slight reactions are obtainable by intradermal testing with 1 per cent or 2 per cent solutions of pollen. Weaker solutions are negative as a rule.

The perennial cases show positive reactions to such common inhalants as house dust, feathers and other animal danders, orris root, tobacco and pyrethrum. Most of the positive reactions in the inhalant groups prove to be actual causative factors by clinical trial.

Although positive skin tests to foods were obtained, it was only rarely felt that this was of clinical significance. A few cases to illustrate allergic cough are presented briefly.

### *Seasonal*

*Case 1*—A S., male, age 54, was first seen January 11, 1937, complaining of a severe non-productive cough since August 1936, worse indoors, interfering with work and sleep. One daughter has asthma, another gastrointestinal allergy.<sup>5</sup>

Although his present cough dates back only a few months, he states that beginning with the fall of 1915, he had a similar cough occurring each year late in August and ending with the frost, but gradually extended into the winter months. At no time did he have nasal symptoms suggestive of hay fever. There was never any dyspnoea, wheezing, or difficulty in expiration. Suspicious of tuberculosis, the Board of Health kept him under observation for a number of years. Roentgenograms of the chest and the sputum examinations were performed repeatedly.

by this agency, and by private physicians as well, and proved to be negative. Examination of the heart and lungs revealed no cause for the cough. There was no evidence of an upper respiratory infection, post-nasal drip, or nasal allergy.

Intradermal testing gave positive test with ragweed (mixed), house dust, feathers, dog dander, wool, tobacco, pyrethrum, egg-white, corn, chocolate, coffee, tea, oats, tomato, cabbage, English walnut and buckwheat. Clinically, the patient proved to be sensitive to ragweed, house dust, pyrethrum, and buckwheat.

The treatment consisted of immunization with house dust and ragweed and of the elimination of the other offenders. Ephedrine was given by mouth. The results were startling. After the first treatment the coughing spells were markedly reduced and the patient was able to sleep through an entire night.

Further injections with dust and ragweed resulted in complete amelioration of the distressing cough. These injections were continued throughout that winter and spring into the fall. There were no symptoms during the ragweed season. To date the patient gets only an occasional coughing spell although there has been no treatment since October 1937.

*Comment*—Allergy was suspected in this case because of the seasonal onset and occurrence of the cough, the allergic family history, and the negative physical findings. That this suspicion was justified is proved by the excellent results obtained through allergic investigation and treatment. Although tobacco was not involved in the production of the cough, the positive test was significant because in the past year the patient complained of intermittent claudication, diagnosed as thrombo-angitis-obliterans, which is considered by Harkavy<sup>6</sup> and Sulzberger<sup>7</sup> to be a vascular allergic reaction. Relief from the claudication was obtained by the cessation of smoking.

*Case 2*—E. H., age 53, male, sought consultation on September 9, 1937, because of a severe and almost continuous dry cough three weeks in duration. He recalled that in 1935 he had a similar coughing spell which started about August 15 and lasted into early October. It has been so severe and was so

unresponsive to the usual medication that he had been referred to a hospital where x-ray and other laboratory studies had been made. These proved negative. With the onset of winter, his cough disappeared completely, only to recur in August 1936. The same occurred again in August 1937. The present cough was unassociated with any nasal symptoms. The family history was essentially negative for allergy, except that a daughter was subject to mild wheezing without dyspnoea. As a young man, the patient suffered from severe headaches (migraine).

Percussion, auscultation, and fluoroscopy of the chest were negative. There was no evidence of nasal allergy or infection.

In view of the seasonal nature of the cough, the patient was tested intradermally with ragweed and found sensitive. Other inhalant sensitivities included house dust, goat epithelium, fish glue, rabbit epithelium, cotton seed, tobacco and kapok. Of these, kapok and house dust were considered of importance. His kapok pillow was enclosed in an allergen-proof casing and treatment was instituted with both the house dust and ragweed extracts. Response was immediate and excellent. The patient did not return for pre-seasonal treatment with the ragweed in 1938, but nevertheless had no return of similar symptoms in the fall of that year.

*Comment*—Here again the seasonal occurrence of the cough and the allergic history (migraine) led to the correct diagnosis and treatment. The cough follows the typical pattern of pollinosis, hay fever, and asthma. Symptoms appeared about the fifteenth of August, gradually became worse and reached their zenith the first week of September, at the height of the pollen season.

A number of cases summarized below (see chart) showed their symptoms, during June and July when the grasses and plantain pollinate (cases 3, 4, 5, 6, 7). No cases were seen which were sensitive to the pollens of the trees.

#### *Perennial*

*Case 3*—Miss L. K., age 33, was referred for an allergy examination in October 1936 primarily because of urticaria. On questioning, she also suffered from a severe cough, 12 years in duration. It was perennial, but worse in the summer and fall, was non-pro-

Cause No	Age	Sex	Duration of Cough	Seasonal or Perennial	Associated Types of Allergy	Positive Skin Tests	Clinical Sensitivity	Treatment	Results
1 A S	54	M	22 years	Seasonal	Thrombo-angio- itis obliterans (?)	Ragweed, house dust, feathers, dog dander, wool, tobacco, pyrethrum, egg white, corn, coffee, tea chocolate oats, tomato, cabbage, Eng walnut, buckwheat	Ragweed, house dust, pyrethrum, buckwheat	Immunization with house dust and ragweed	Excellent
2 E H	53	M	3 years	Seasonal	Migraine	Ragweed, kapok, house dust, goat and rabbit epithelium, fish glue, cotton seed, tobacco	Ragweed, house dust, kapok (?)	Immunization with house dust and ragweed	Excellent
3 L K	33	F	12 years	Perennial	Urticaria Migraine	House dust, orris root, ragweed, timothy, plantain, orange, lima bean, mustard, green pea, haddock, codfish, tomato	House dust, orris root, ragweed, timothy, plantain	Immunization with house dust, orris root and pollens	Poor—No cooperation
4 J P	67	M	Life- long	Perennial	None	House dust, timothy, plantain, rye	House dust, timothy, plantain, tobacco, rye, tea	Immunization with house dust and pollens	Good
5 R M	4	F	3 years	Seasonal	Urticaria	House dust, timothy, plantain	Timothy, plantain	Immunization with timothy and plantain	Excellent
6 M M	30	F	3 weeks	Seasonal	None	Timothy, plantain	Timothy, plantain	Immunization with Pollens	Excellent
7 E N	5	F	2 years	Seasonal	None	Timothy	Timothy	Immunization with timothy	Excellent
8 G B	40	F	9 years	Seasonal	None	Timothy plantain	Timothy, plantain	Refused	Seasonal cough continues
9 M H	48	F	1 month	Seasonal	None	Timothy, plantain, house dust	Timothy, plantain, house dust	Immunization with timothy, plan- tain and house dust	Good
10 M M	44	F	2 years	Perennial	None	House dust	House dust	Immunization with house dust	Good
11 L Der	50	M	10 years	Perennial	None	House dust	House dust	Immunization with house dust	Good
12 J M	43	M	4 years	Perennial	GI allergy	House dust, most animal danders, ragweed, tobacco	House dust, tobacco, ragweed	Immunization with house dust and ragweed	Slight

1942

## DISEASES OF THE CHEST

ductive and was unassociated with any fever, night sweats, or loss of weight. Repeated examinations, including many radiographs of the chest and sinuses, were negative. Trips to Florida and Arizona were of no avail. A most thorough examination in a large diagnostic clinic, including bronchoscopy, was negative.

The family history was negative for allergy or tuberculosis. In addition to hives and the cough, the patient was subject to severe attacks of migraine. She was aware that pears, pumpernickel bread and carp produced hives. She noted, also, that reading the colored comics or the rotogravure section of the Sunday newspapers made her cough spasmodically. She coughed a great deal in the subways, night clubs and theatres. The cough had been so severe as to interfere with her profession—singing.

Skin testing showed a multiple sensitivity both to foods and inhalants (see chart). Relative to the cough it was felt that positive tests to house dust, orris root, timothy, plantain and ragweed were significant, the patient was given injections with the house dust, orris root and ragweed with slight relief of her symptoms. For complete relief it was suggested that she refrain from the usage of perfume which she used in usual quantity, and that she abstain from visiting night clubs and theatres. This she refused to do and she still coughs.

*Comment*—This case showed many manifestations of allergy. It was therefore important to evaluate the role of allergy in the production of her cough. The patient was sensitive to pollens and had seasonal exacerbations of a cough which was always with her because of her sensitivity to house dust and orris root. This simulates the pattern of behavior of many cases of asthma and vasomotor rhinitis.

A bronchoscopy which was performed to rule out the presence of a malignancy in the bronchi as the cause of the cough failed to record the nature of the mucous membranes. A pale edematous mucous membrane would have been most convincing as to the role of allergy in the production of this severe cough.

*Case 4*—J P, male, age 67, had a cough as long as he could remember. It occurred in spasms, and was particularly aggravated

by a dusty or smoky environment. He had been advised by a physician to give up smoking several years ago, and noted a marked improvement thereafter. There was a return of the cough in June of 1937 in spite of complete abstinence from smoking, and he sought consultation.

The family allergy history revealed a brother who was asthmatic, a nephew and a niece who were asthmatic, a son who has vasomotor rhinitis. The physical examination showed the presence of emphysema and some scattered rales in both bases. Occasional wheezing was heard. Outside of an accelerated respiratory rate due to the emphysema, there was no evidence of the respiratory distress of the asthmatic. In view of the allergic background, the patient was skin-tested and found sensitive to house dust, tobacco, timothy, plantain, and rye. His cough improved with treatment by injections of dust and the pollens. He was advised to avoid smoky atmospheres and not to eat rye. There was a return of the symptoms, but less severely in June 1938. No treatment was given. The patient has also observed that the drinking of tea will make him cough. He had been negative to tea by the intradermal testing.

*Comment*—Here we have a marked familial history of allergy which indicated the direction for investigation. The seasonal aggravation corroborated the impression that allergy was the basic cause of the cough. The role of tobacco in this case is interesting. The impression is that he is allergic to tobacco smoke even though the intradermal test was negative.

#### Discussion

Chronic cough is a problem with which the physician is constantly confronted. In a recent analysis of the problem, Keyton<sup>8</sup> concludes that the most common causes of the chronic cough are an upper respiratory infection and the passive congestion resulting from cardiac failure. He lists altogether about 30 distinct causes of cough but does not mention the role of allergy. Pendergrass,<sup>9</sup> in a similar study, also makes no mention of the role of allergy. Taylor<sup>10</sup> stresses in particular the need for investigating the sinuses in determining the etiology of a persistent cough. Wyllie,<sup>11</sup> studying the problem of chronic



cough in children, mentions a cough of undetermined origin associated with colicky pains and mucous stools. This may be on an allergic basis, in view of the newer knowledge of mucous colitis.<sup>12</sup>

The role of allergy in the production of cough has been noted before. Colmes and Rackeman<sup>13</sup> described two cases of allergic cough which they concluded was a forerunner of true bronchial asthma. This, however, has not been our experience. Only one case described here developed asthma. Clein<sup>14</sup> stresses the importance of allergy as a cause of the frequent colds and chronic cough in children and refers to the earlier observations of Piness and Miller.<sup>15</sup> Kahn<sup>16</sup> has described cases of cough on allergic basis and has even produced the symptoms experimentally by overdosing the patient with the specific allergen. He also feels that this is preliminary to asthma, periods of coughing alternating with periods of asthma. He gets excellent results with anti-allergic therapy.

The site of the allergic reaction is a moot question. Kahn<sup>16</sup> believes it to be in the trachea, and therefore labels his cases Allergic Tracheitis. We can only conjecture at this time, not having seen the shock organ involved. Our impression, however, is that the allergic reaction (edema of the mucous membrane) occurs deep in the throat, possibly involving the larynx. This is concluded from the fact that many of the patients complain of an itchy, scratchy or tickling sensation in that region. Also, periods of hoarseness is a rather frequent complaint. It is the edema of the mucous membrane involved that reflexly causes the cough. This is comparable to the itchy or tickling sensation in the nose of the hay fever patient which precipitates the sneezing spells.

It is well known that the entire respiratory tract beginning with the nose and down to the terminal bronchioles is subject to allergic reactions, as witness hay fever involving the nose, asthma and allergic bronchitis involving the bronchial tree, and now allergic cough involving the respiratory mucous membrane between these two shock areas.

The so-called tobacco, or "smoker's cough," in many cases is probably explicable on an allergic basis, i.e., allergy to tobacco and smoke. Where other forms of allergy are present, the patient should be investigated

from the allergic point of view before concluding that the mechanical irritation of the smoke is the sole factor in producing the cough. Cases 4 and 12 show this clearly. Indeed, many an asthmatic obtains some slight relief from smoking, indicating that the mechanical and chemical irritation of the smoke is not always a factor in the initiation of the coughing spells. Where the patient is ragweed- or pyrethrum-sensitive, the role of tobacco must be particularly investigated in view of the close biologic relationship of these weeds.

### Conclusions

1) A severe paroxysmal type of cough, unresponsive to ordinary treatment, is here described as a form of allergy.

2) The site of the allergic reaction (edema) seems to be deep in the throat about the larynx.

3) The allergic cough resembles other allergic phenomena in that (a) It occurs in individuals with a marked personal and/or family allergic history. (b) The patient shows skin sensitivity by testing with allergens. (c) It responds therapeutically to immunization with the specific offenders and (d) it is periodic. Exposure to the allergen produces symptoms. Removal of the allergen relieves the symptoms.

4) Cases of allergic cough may be grouped into two distinct categories. (A) Seasonal, (B) Perennial. The seasonal cases are due to the pollens commonly causing hay fever and asthma. Perennial cases are due principally to such inhalants as house dust, feathers,orris root, etc. Foods play but a minor role in the production of this type of cough.

144 West 86th Street

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## The Road to Early Diagnosis

J R PATTON, M.D., F.A.C.C.P.\*  
Ogdensburg, New York

"A stitch in time saves nine"

No truer axiom could be applied to our program for the eradication of tuberculosis. Definitely, early diagnosis with proper treatment means, in a great majority of cases, early recovery.

How shall we pave this road to early diagnosis? This undertaking, in most instances, will be a community problem. Adequate organization of our official and unofficial health agencies is of paramount importance and must be undertaken with the idea of the correlation of these facilities. If these agencies are not already in existence, then measures should be taken to establish same.

It is presumed that in each locality, or at not too great a distance, there exists a sanatorium adequately equipped to treat tuberculosis in all of its forms, and where weekly or semi-monthly chest clinics are conducted, and to which the family physician may refer his patients. In addition, the sanatorium should be equipped to conduct clinics at remote points at frequent intervals for those who may not be able to come to the sanatorium.

Obviously, the larger cities, villages and industrial centers should receive the benefit of more frequent visits by the clinic.

*Apriori*, it is quite evident that we cannot wholly depend on the patient coming to the

sanatorium, but we must take the facilities of our clinic to the patient.

Furthermore, all health activities should be under the guidance of a District State Health Officer and his staff. Therefore, our two most important agencies in arriving at an adequate program for the control of tuberculosis are the sanatorium and staff of the District State Health Office and staff.

One of the most outstanding links in a successfully welded chain of endeavor in our program is the family physician. Only through his cooperation will our aims be achieved. He must refer the patient to the clinic for special examination and evaluation of findings. Obviously then, the family physician must show willingness to accept our aid, he must be familiar with the "earmarks" of tuberculosis, he must have a knowledge of the groups of individuals from which most tuberculosis results, he must be appreciative of the importance of examining, especially, the adult contact members of the household. The family physician should facilitate the immediate hospitalization of active tuberculous individuals, he must lend all aid in cooperating with the District State Health Officer and his staff of physicians and nurses in unearthing the source of infection. The physician duly and truly must report all his cases of tuberculosis and all deaths caused by tuberculosis immediately.

In many communities the County Welfare

\* Medical Director, St Johns Hospital

Department is financially responsible for the care of tuberculous patients. This department should be in close cooperation with the district state health office and the sanatorium, and be furnished with current information regarding admissions of patients to sanatorium and discharges.

The economic welfare of the patient's dependents is of extreme importance since the care of a tuberculous patient is a Public Health charge and should not be the means of the pauperization of the family. By the same token, to avoid manifest tuberculosis in an infected family, adequate means should be provided to keep the hospitalized member of the family free from mental stress, and the members of the family free from mental stress and impoverishment. Thus, our county welfare organization will play an important part in our program.

A standing Public Health Committee which acts in an advisory capacity to the county welfare department is a very desirable factor.

How shall we educate the general public relative to the importance of what the word tuberculosis means, what one should do to determine the existence of tuberculosis, and in general what is being done to eradicate tuberculosis, and what has been done in the past to control this disease?

The way was made easier when, in 1903, a Danish postal clerk, Einar Holboell, arrived at the idea of offering to the public the Christmas Seals to raise money to care for sick children. Later, in 1907, Miss Emily P. Bissell of Wilmington, Delaware, introduced this method of fund raising for the control of tuberculosis in America. This received, immediately, the official sponsoring of Doctor Edward Livingston Trudeau and his National Tuberculosis Committee.

At the present time, there are in the United States and its possessions over 2,000 state, county, and city tuberculosis associations. Several millions of dollars derived from the sale of these penny stamps have contributed largely to financing ways and means of controlling tuberculosis and instituting proper legislative action. Under the leadership of well qualified executive secretaries, educational programs are continuously being carried on.

These organizations should be closely link-

ed to the district state health office and the sanatorium for guidance. They should keep the public ever cognizant of the means of eradicating tuberculosis. This may be done through newspaper publicity, meetings, talks, moving pictures, posters, window displays and radio broadcasts.

For the past several years the National Tuberculosis Association has instituted an Early Diagnosis Campaign during the month of April. They have worked in conjunction with official and unofficial health agencies in an educational manner to make the public tuberculosis minded, to educate them to the need of early discovery, and to the importance of contacting their family physician for early examination and x-ray. The County Tuberculosis Association, through its Speaker's Bureau, is able to contact lay organizations such as Parent-Teachers' Association, City Clubs, Granges, and Service Clubs, thus securing their cooperation in aiding the fight against tuberculosis.

Therefore, the work of the Tuberculosis Association in an educational manner is of definite importance in our efforts to discover tuberculosis in its incipency. We are all aware of the value of health education in preventive medicine.

Where shall we look for tuberculosis? On what groups shall we concentrate our efforts? Since tuberculosis leads in the cause of death in the age group from 18 to 35, we shall be ever mindful to include this group in our surveys.

May I, at this time, interject this statement. During the past two years a majority of newly discovered cases of tuberculosis in our county have been in the 40 to 60 age bracket, with sporadic cases between 60 and 74. It is quite evident that improved methods of searching for the source of infection is gradually bringing to light the so-called grandmother and grandfather tuberculosis spreaders, who have been undoubtedly, for many years, disseminating infection and were thought to be suffering with catarrh, asthma or bronchitis.

#### *Groups to Be Examined*

1) Obviously, adult household contacts will be the group from which our yield is most fruitful.

2) Those in low income and indigent

bracket

3) Workers in dusty industries, especially those exposed to free silica, such as potters, tool grinders, miners in hard rock, workers using sand for polishing, facing brick etc. A majority of companies engaged in dusty industries include an x-ray of the chest in the examination for employment. In St Lawrence County a number of early cases of tuberculosis have been diagnosed as a result of this procedure. When, and if all employers follow this procedure, the discovery of early tuberculosis will be considered enhanced.

4) Medical students, nurses, and hospital employees

5) Draftees and trainees for war industries

6) University, college and high school students (those 15 years and over)

7) We have just spoken of the necessity of including an x-ray examination of the chest as a part of the physical examination of all applicants for employment. It is just as important to follow this procedure in making routine periodic examination of employees. Hospital workers, nurses and student nurses, interns and medical students should also receive the same type of medical supervision. It is an established fact that medical supervision of this class of worker is, at present, inadequate and it is assumed in many instances that they have some sort of special immunity to disease, but on the contrary, their duties are quite arduous, they are often fatigued, they are often exposed unknowingly to tuberculosis (in general hospitals) and therefore are more susceptible to tuberculosis.

We now have knowledge that many cases of tuberculosis are admitted unknowingly to general hospitals. In the general hospital of this city 19 cases of tuberculosis were discovered in 1940 by x-ray of the chest. A considerable number of new cases of tuberculosis have been yearly discovered by routine x-ray of the chest in a large mental hospital in this city. It has been estimated by Dr Robert E Plunkett and Dr Edward Mikol, both of the New York State Department of Health, Albany, New York, that between 10 and 20 per cent of tuberculosis deaths occur in general hospitals, furthermore, that 10 per cent of adults admitted to general hospitals have clinical pulmonary tuberculosis.

On this basis, Drs Plunkett and Mikol reported that it is estimated that more than 40,000 unrecognized cases of tuberculosis are admitted annually to general hospitals in this country. In two-thirds of these patients the disease could be discovered only by means of routine x-ray films of the chest. In my opinion, even more tuberculosis could be found in the mental hospitals.

8) Physical examinations for insurance usually do not require an x-ray of the chest. Heart examinations, blood pressure, urine examination, eye examination, etc., all are present, but no x-ray of the chest. In a number of instances, in my own experience, individuals have developed tuberculosis within a year or so after having successfully passed an examination for life insurance. Routine x-ray examinations in this group would materially aid our endeavors to discover early tuberculosis.

9) It is quite essential that applicants for employment as teachers should have an x-ray examination of the chest, since they will be in contact with the minor age groups and in a position to disseminate infection. Incidentally, for the past several years the laws of New Jersey have made this examination mandatory.

10) Another group which should have special attention in our program is the expectant mothers. We are all cognizant of the clinical course of tuberculosis when lighted up after delivery of the mother. Quite often the progress of tuberculosis in these cases pursues a rapid course to a fatal termination. Therefore, an x-ray of the chest of the expectant mother is quite as necessary as the Wasserman Test.

Early discovery of tuberculosis in the expectant mother and adequate treatment in many instances will allow her to give birth to a child with comparative safety.

We should enlist the cooperation of district and local health agencies, boards of education and physicians in stimulating the work in these groups.

An adequate case-finding program, including tuberculin testing and x-raying of positive reactors or exclusive x-raying if funds are available with special attention to contacts, should be the method of choice. To further enhance a tuberculosis survey, those in whom the x-ray demonstrated a consid-

erable amount of tuberculous infection, but no manifest tuberculosis, should be persuaded to have the adult household contacts examined, thus paving the way for the discovery of the source of the infection

Our best single asset in the discovery of early tuberculosis is the x-ray. One can see tuberculosis in many instances when one cannot hear it. Research studies are constantly being made to lower the cost of the x-ray.

Apropos of the symptomatology associated with tuberculosis, there is no definite symptom complex. We all have a knowledge of the individual who outwardly appears to be in good health and may even be of the athletic or rugged type, but nevertheless may have tuberculosis. It does not necessarily follow that an individual who has temperature, loss of weight, cough, sputum, fatigue, or even hemorrhage, has tuberculosis. However, if any of these symptoms do manifest themselves, an examination including x-ray of the lungs is in order.

Apropos of mass surveys and the use of the tuberculin test. Old Tuberculin, Purified Protein Derivative or the Patch Test can be used. With the use of Old Tuberculin, the expense is somewhat lessened, but in any group, false reactions due to protein sensitization will be seen, and in many instances, several dilutions should be used. It is, therefore, more desirable but more expensive to use the Purified Protein Derivative (PPD) and thus avoid these false reactions. It has been my experience that the PPD is very potent and should be used with due caution. Avoid the use of the second strength whenever possible. In our surveys among high school, college, and university students, where one test is to be used, experience has taught us that one should use ten times the first strength dilution when making only one test. This dilution was found to be very satisfactory and no severe reactions resulted. O T (Old Tuberculin) and PPD are used via the Mantoux or intradermal method (between the layers of the skin).

During the past several years the Patch Test has been widely used. This consists of squares of tuberculin placed upon adhesive strips with a central square of control material and applied to the forearm or back (Vollmer Patch). A similar test, the Wolff Test, makes use of a pea-sized amount of

tuberculin ointment and a similar amount of control material.

It must be kept in mind that positive reactions to tuberculin often are delayed. The reading is usually made at the 48th hour. In any group some of the positive reactions will be seen at the 72nd hour or even the 96th. Therefore, if one reading is to be made, the 72nd hour should be the one of choice.

During a recent high school survey in this county, the daughter of one of the superintendents of schools reacted positively to the test. The x-ray revealed no manifest disease in the chest. Last summer this girl developed symptoms referable to the abdomen. Various diagnoses were made and finally an exploratory operation was performed. An active tuberculous appendix was found. By the same token and during the same survey a positive tuberculin test on a junior in high school was the incentive for the x-ray and discovery of advanced adult type of tuberculosis. It was known that this physician's son had been in contact, for a number of years, with a tuberculous mother. He never acquiesced to the suggestion that an x-ray be taken of the chest. Necessarily, all reactors in the high school group were x-rayed. Thus was brought to light an advanced state of adult tuberculosis. This boy is now in a sanatorium.

It is the opinion of some authorities that tuberculin testing and x-raying of positive reactors should include children. In other words, one can, in such a procedure, put the cart before the horse. If the children show a large amount of tuberculous infection, obviously the first source of infection would be the family adult household contacts. Thus the discovery of early adult type tuberculosis might be further enhanced by this type of survey. We have found in our work in this county that few individuals under 15 years have to be hospitalized for manifest pulmonary tuberculosis. Those with active primary type of tuberculosis infection, with modified sanatorium regime instituted at home, do very well. Therefore, as regards those under 15, it might be said that tuberculosis does not present a serious problem between the ages of 5 and 15. From birth to the age of 5 we might do well to check closely those who have become infected, especially when the infection shows a tendency to become manifest disease. This precaution

should be exercised, not because of the lung pathology *per se*, but because of the possible various complications such as a blood stream infection (miliary type) with complicating meningitis or peritoneal involvement with fatal termination

In making school, college, and university tuberculosis surveys—faculty, workers, and especially food handlers, should be examined. This group may give you a better yield of tuberculosis than the student body.

Naturally, one should frown upon wholesale tuberculin testing. This procedure does not constitute an adequate case-finding program. We should direct our efforts, when using this test, to groups from which a fruitful yield of tuberculosis is to be expected. The testing should be augmented by x-ray examinations of positive reactors, the x-raying of those who are contacts and refused the test, and an adequate follow-up program.

In making early surveys using the tuberculin test, namely among nurses, medical students, and hospital workers, if the test is negative one year, and positive the following year, it is of extreme clinical significance.

In paving the road to early diagnosis, the essential stepping stones are forthwith summarized.

1) The organization of all official and unofficial agencies in one's respective locality

2) The institution of surveys to include those groups from which we can expect the most fruitful yield of tuberculosis

3) Do not neglect the 1 to 5 years group if tuberculosis exists in the household

4) Concentrate on the 18 to 35 age group, but do not neglect the 40 to 60 group

5) The hospitalization of all active cases

6) The examination of adult household contacts

7) Increased traveling clinics

8) The examination and x-ray of individuals who are apparently ill but cause is uncertain

9) Chest x-rays for all life insurance applicants

10) The x-ray of all pre-natals

11) The education of the family physician to the importance of early x-ray

12) The x-ray of the chest of all applicants for employment with special attention to dusty industries and routine periodic x-ray thereafter

13) Routine x-rays of chest of patients admitted to general and mental hospitals. Also, routine periodic x-ray of all employees in these hospitals

14) The continuous concentrated efforts of all health agencies

*St Johns Hospital*

## Organization News

### REPORT OF COMMITTEE ON MILITARY AFFAIRS

Shortly after the declaration of war upon the axis nations by Great Britain, the American College of Chest Physicians, meeting in annual session at New York City, appointed a Committee on Military Affairs to coordinate the efforts of the chest specialists in this country and to render whatever service they could as an organized body to the Surgeons General of the Army and the Navy, and to the country as a whole. The committee was organized in June, 1940, with Dr Chas M Hendricks, El Paso, Texas, as chairman. The other members of the committee were Drs Hugh A Kinghorn, Saranac Lake, New York, Ralph C Matson, Portland, Oregon, Edgar Mayer, New York City, J Winthrop Peabody, Washington, D C, Joseph W Post, Philadelphia, Pa, and Walter E Vest, Huntington, West Virginia. The activities of this committee were reported

at the Cleveland meeting of the College in June, 1941, and the complete report was published in the October, 1941, issue of the Journal (Vol VII, No 10 1941)

Dr Hendricks was reappointed as the Chairman of this committee following the Cleveland meeting and the following new members were added: Brigadier General S U Marietta and Commander Robert E Duncan, Washington, D C, Drs Joseph C Placak, Cleveland, Ohio, and Arnold Shamaskin, Albuquerque, New Mexico.

The committee has been cooperating with the Subcommittee on Tuberculosis of the Committee on Medicine of the National Research Council, with the Surgeons General of the Army and Navy, and with the Committee on Medical Preparedness of the American Medical Association. The letter reproduced on the editorial page of this issue of the Journal acknowledges the work accomplished in connection with the Committee on Medical Preparedness of the American Medi-

## cal Association

The information concerning the qualifications of Tuberculosis Specialists furnished by the College to the Committee on Medical Preparedness of the American Medical Association is being turned over to the Procurement and Assignment Service which has been set up recently at Washington under the direction of Major S F Seeley MC, U S Army. This information will be attached to the data which the physicians are being asked to supply on a new questionnaire to be released shortly by the Procurement and Assignment Service.

This new questionnaire is not to be confused with previous questionnaires filled in by physicians. The purpose of this new questionnaire will be to ascertain the place where each physician in the United States can best serve his country in the war effort. It is important that every member of the College complete the questionnaire and return same promptly. If you do not receive a copy of the questionnaire, write to the Procurement and Assignment Service, 601 Pennsylvania Avenue, Washington, D C, for a copy.

The Committee on Military Affairs of the College will continue to cooperate with all of the agencies previously established to aid in the war effort and with the Procurement and Assignment Service recently established.

## NEW YORK STATE CHAPTER TO MEET

The New York State Chapter of the American College of Chest Physicians will hold its annual meeting in conjunction with the meeting of the New York State Medical Society at the Waldorf Astoria Hotel, New York City, on Thursday afternoon, April 30th.

A symposium on diseases of the chest sponsored by the New York State Chapter of the College will be held before the General Assembly. The following speakers will take part in the program.

Dr Edgar Mayer, New York City, who has been chosen as the recipient of the A Walter Sulter Lectureship of the Medical Society of New York. This Lectureship is awarded to the outstanding speaker of the General Sessions. The New York State Chapter is justly proud to have one of its members and former President be selected as the outstanding speaker of the meeting. Dr Mayer's presentation will be, "New Aspects of Pulmonary Tuberculosis and Their Significance in Medical Practice."

Dr Eugene P Pendergrass, professor of Roentgenology, University of Pennsylvania Medical School and Director Department of Radiology, University of Pennsylvania Hospital Philadelphia, Pa, will present a paper on "The Role of the Radiologist in the Diagnosis of Lesions Involving the Respiratory Tract."

Dr Richard Overholt, Boston, Mass, formerly Director Department on Thoracic Surgery, Lahey Clinic, will present a paper on "Cancer of the

## Lung"

Dr Arthur Q Penta, Visiting Lecturer in the Department of Medicine, Temple University Medical School, Philadelphia, Pa, and Director of the Bronchoscopic Clinic of the Schenectady City Hospital, will present a paper on, "The Role of the Bronchoscopist in the Diagnosis and Treatment of Diseases Involving the Bronchial Pulmonary Tract."

The above mentioned papers will be given before the General Assembly on the afternoon of Thursday, April 30, 1942, Waldorf Astoria Hotel, New York City. The officers of the New York State Chapter sincerely hope that every member of the State Chapter will be in attendance.

*Arthur Q Penta, Secretary  
New York State Chapter of the  
American College of Chest Physicians*

## OHIO STATE CHAPTER TO MEET

The Ohio State Chapter of the American College of Chest Physicians will hold its annual meeting at the Neil House, Columbus, Ohio, Wednesday, April 29. A luncheon will precede the meeting, which is to be addressed by a speaker of note. Election of officers for the coming year will be held. The Ohio Chapter of the College meets jointly with the Ohio State Medical Society.

PROGRAM OF THE TEXAS CHAPTER  
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MAY 11, 1942

During the Texas Medical Society Meeting  
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Dr C M Hendricks, El Paso, Texas, President,  
Dr J B McKnight, Sanatorium, Texas, Vice  
President, Dr C J Koerth, San Antonio, Texas,  
Secretary-Treasurer

## Afternoon Session—May 11, 1942

Time 1 30 P M Room French Room, Rice Hotel

1) Paper titled "Tuberculosis Tracheobronchitis," Dr David McCullough, Sanatorium, Texas. Discussion opened by Dr Henry Hoskins, San Antonio, Texas.

2) Paper titled "Fungus Disease of the Lung," Dr Alvis Greer, Houston, Texas, and Dr Henry N Gemoets, Houston, Texas. Discussion opened by Dr Sam Thompson, Kerrville, Texas.

3) Symposium on Surgical Treatment of Tuberculosis

a) Paper titled "Post-Thoracoplasty Care, Scoliosis, Pain and Rehabilitation," Dr Robert Shaw, Dallas, Texas.

b) Paper titled "Thoracoplasty," Dr E W Coyle, San Antonio, Texas.

c) Paper titled "Interpleural Pneumonolysis," Dr J Emerson Dailey, Corpus Christi, Texas.



Discussion on symposium to be opened by Dr Felix Miller, of El Paso, Texas

4) Paper titled "Unusual Tumor of the Tongue," Dr R G McCorkle, San Antonio, Texas

Discussion opened by Dr A O Severance, San Antonio, Texas

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#### *Evening Session*

May 11, Business Meeting and Election of Officers, Time, 6 00 P M, French Room Rice Hotel  
Dinner will be served at evening session

Guest speaker, Dr Ralph C Matson, Portland, Oregon, will present a paper titled "Thoracoplasty in Diagnosis of Intrathoracic Tumors"

#### *Entertainment Committee*

"Dr Alvis E Greer, Chairman, Dr H Caplovitz, Dr Henry N Gemoets, Dr T R Jones, Dr F Hartman Kilgore, Dr Shaw McDaniel, Dr John R Phillips, Dr George Waldron, Houston, Texas

#### INDIANA CHAPTER MEETS

The Indiana Chapter of the American College of Chest Physicians held its midwinter meeting at Columbia Club, Indianapolis, on March 22, 1942, at 2 00 P M

The following program was presented

1) Dr John V Thompson, Indianapolis, Ind, "Monaldi Procedure With Three Cases"

2) Dr Paul Crimm, Evansville, Ind, "Parafine Apicolysis"

3) Dr M H Draper, Fort Wayne, Ind, "Allergic Lung Conditions"

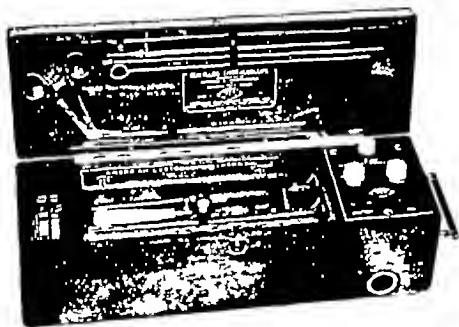
4) Dr J V Pace, New Albany, Ind, "Diagnosis by Lipiodol"

5) Dr P H Becker, Crown Point, Ind, "Silico Tuberculosis"

6) Dr H B Pirkle, Rockville, Ind, "Several Diagnostic Problems"

7) Dr J H Stygall, Indianapolis, Ind, X-Ray Conference

The meeting was well attended by the Fellows of the College in Indiana and a number of guests were present which included Dr Paul A Turner, Louisville, Governor of the College for Kentucky, Dr Otto C Schlack, Oak Forest, Illinois, President of the Illinois Chapter of the College, Dr John A Proffitt, Louisville, Kentucky, Thomas A Hendricks, Secretary of the Indiana State Medical Society, and Murray Kornfeld, Chicago, Executive Secretary of the College Dr James H Stygall, Indianapolis, Governor of the College for Indiana, presided at the business session and Dr Merlin H Draper of Fort Wayne, President of the Indiana Chapter, presided at the scientific program The next meeting of the Chapter will be held in connection with the annual meeting of the Indiana State Medical Society



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The Dennis is *the* place to stay during the convention, June 6, 7, and 8. All Convention sessions will be held at the Dennis—and you can be on hand for every one of them.

But the Dennis has more to offer than convenient location. This big, ocean-front hotel is really “a resort within a resort”—where you can combine pleasure with the business of convention meetings.

You can sit back and relax on the broad

sun decks, in the solaria and luxurious public rooms. Or you can join the gaiety on the hotel beach, take a dip in the surf, lounge in the cabana colony. Other features include fine food, daily entertainment, game rooms, modern garage on the premises.

Make your reservation today. Rates are moderate. Both American and European plans.

**STAY OVER FOR the A M A Convention** The Dennis is right in the heart of A M A Convention activities—midway on the Boardwalk, just 3 short blocks from Convention Hall.

*Hotel* **DENNIS**

**A RESORT WITHIN A RESORT  
 ON THE BEACH AT**

*Atlantic City*

## SANATORIA DIRECTORY

*The sanatoria listed in this section are among the finest private sanatoria in the United States  
They are prepared to offer private, individual, specialized care to your patients*

Information Regarding This Space  
Will Be Sent on Request

**CALIFORNIA SANATORIUM**  
Belmont, California

**CHENIK HOSPITAL**  
Detroit, Michigan

**KULA SANATORIUM**  
Watakoa, Maui, T H

**LAUREL BEACH SANATORIUM**  
Seattle, Washington

**LONG SANATORIUM**  
El Paso, Texas

**MARYKNOLL SANATORIUM**  
Monrovia, California

**PALMER SANATORIUM**  
Springfield, Illinois

**PORTLAND OPEN AIR SANATORIUM**  
Milwaukie, Oregon

**POTTENGER SANATORIUM & CLINIC**  
Monrovia, California

**ROCKY GLEN SANATORIUM**  
McConnellsville, Ohio

**ST. JOHNS SANITARIUM**  
Springfield, Illinois

**SOUTHWESTERN PRESBYTERIAN  
SANATORIUM**  
Albuquerque, New Mexico

**SYCAMORE HALL SANATORIUM**  
Brown Mills, New Jersey

**THE SAMUEL & NETTIE BOWNE  
HOSPITAL**  
Poughkeepsie, New York

**THE SWEDISH NATIONAL SANATORIUM**  
Englewood (Denver) Colorado  
Modern Equipment — Moderate Prices

## Laurel Beach Sanatorium

SEATTLE

(On the Salt Water Beach)

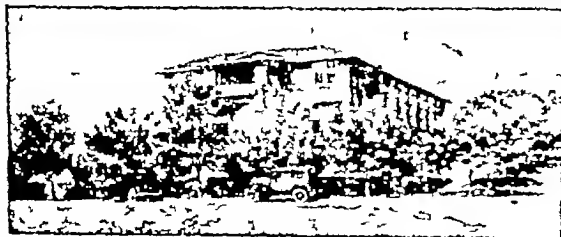
WASHINGTON

A private sanatorium fully equipped for the modern treatment of Chest Diseases X-Ray, Fluoroscope,  
Pneumothorax, Phrenectomy and Thoracoplasty Special diets when required private and semi-private  
rooms. Rates From \$25 00 per week up, including medical care

FREDERICK SLYFIELD, M.D

JOHN E. NELSON, M.D

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*"Where Sunshine Spends the Winter"*

Rates \$20 00, \$22.50 and \$25 00 per week  
Nurses care and medical attention included  
Also Apartments for light housekeeping

### THE LONG SANATORIUM EL PASO TEXAS

ALL ROOMS HAVE STEAM HEAT HOT  
AND COLD RUNNING WATER IN  
ROOM, AND HAVE PRIVATE GLASSED  
IN SLEEPING PORCHES.

*All Recognized Treatments Given*

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Medical Director

T. F. CARBREY, M.D  
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